145185

BACKGROUND INFORMATION
SEARCH ON
CERRO COPPER PRODUCTS CO.
AND THE IEPA SAUGET/DEAD CREEK PROJECT

FOR

LOWENSTEIN, SANDLER, KOHL, FISHER & BOYLAN

BY

SVERDRUP CORPORATION

ST. LOUIS, MISSOURI

December 30, 1987

TABLE OF CONTENTS

I INTRODUCTION

Cerro Copper Products Co. and their predecessors, Cerro DePasco and Lewin-Mathes Company, have operated a secondary copper refinery in Sauget, Illinois since the late 1920s. A portion of the property currently owned by Cerro has been included in a hazardous waste Remedial Investigation/Feasibility Study (RI/FS) conducted by Ecology & Environment, Inc. (E&E) on behalf of the Illinois Environmental Protection Agency (IEPA).

The RI/FS involves twelve (12) individual sites in the Sauget area and six (6) sections of Dead Creek. Cerro owns property that contains one complete site (Site I), one section of Dead Creek (Site A), and a portion of a second site (Site G). The Site Plan in Appendix I illustrates the areas currently being investigated by the IEPA.

A background information search was conducted by Sverdrup Corporation to compile information relating to property ownership, past property usage, site geology, hydrogeology, and previous investigations and events which developed into the current studies being conducted on Cerro property. Because the sites are in close proximity to each other, research was also conducted on the other sites to gather data that may relate disposal activities and contaminants at the various sites. It was also desired to investigate if Cerro could possibly be viewed as a Potentially Responsible Party (PRP) for any of the other sites.

II SITE DESCRIPTION

A. TOPOGRAPHY

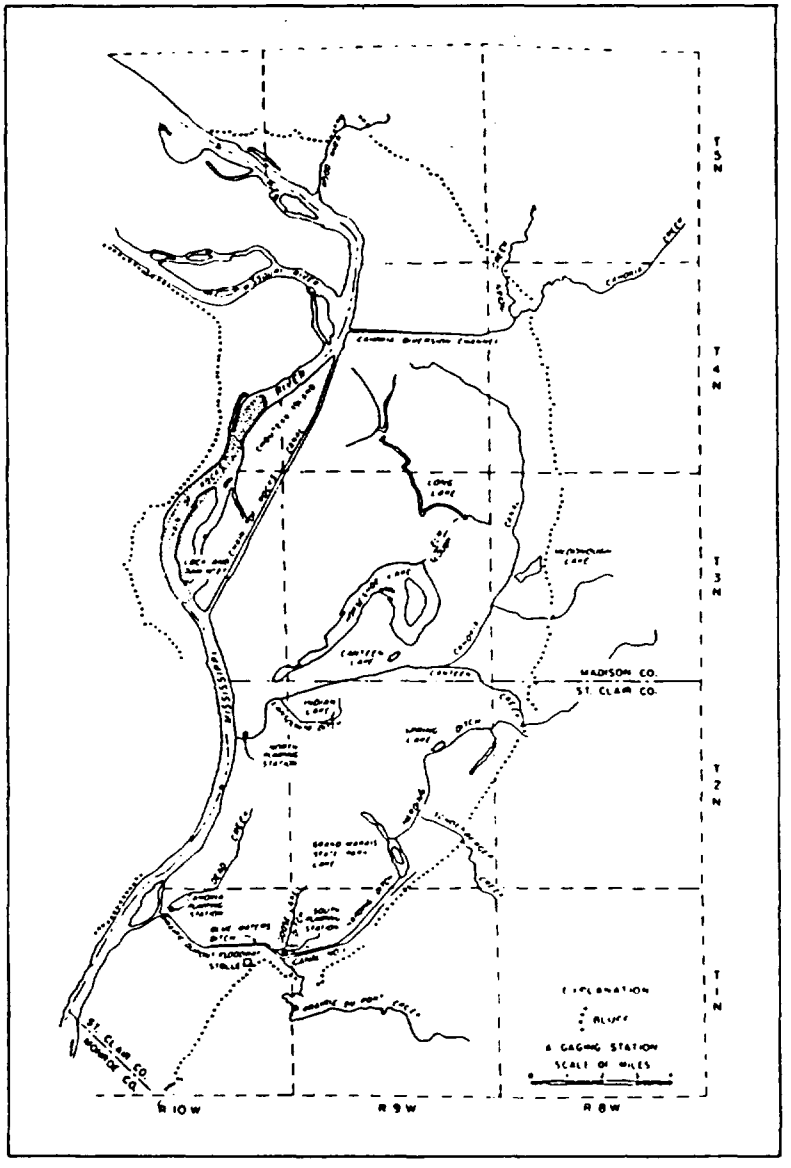
The Cerro Copper Products Plant is situated within the Mississippi River floodplain known locally as the American Bottom. The floodplain is bounded to the west by the Mississippi River and to the east by uplands that generally form a sharp bluff ranging from 100 to 250 feet in height. The floodplain ranges in width from over 10 miles near Granite City to 5 miles in Sauget, and constricts to less than 3 miles at Dupo to the south.

The topography of the American Bottom is typical of a floodplain and contains ridges and swales, low broad swamps, terraces, meander scars and oxbow lakes formed by the shifting Mississippi River. The land surface is relatively flat; the local relief ranges from EL. 400 near the river to EL. 445 along terraces bordering the upland bluffs to the east. The approximate surface elevation at the site is EL. 405. The meandering of the Mississippi River channel east and west across the floodplain has resulted in generally north - south trending ridges and swales, and heterogeneous interbedding of sands, silts, and clays within the surficial floodplain deposits.

B. SURFACE DRAINAGE

Surface drainage is relatively undeveloped, as evidenced by broad swamps found in the floodplain. Drainage is normally towards the Mississippi River and its tributaries: Wood River, Cahokia Diversion Channel, Cahokia Canal and Prairie Dupont Floodway (Figure 1). These tributaries drain much of the floodplain and bordering uplands. Most of the American Bottom is protected from flooding by a system of levees that front the Mississippi River and flank its main tributaries.

Dead Creek is situated between the Cahokia Canal and Prairie DuPont Floodway, and drains the floodplain in the area of Sauget and Cahokia. It originates near the Cerro Copper Products Plant in Sauget, flows southwest through Cahokia and enters the Prairie DuPont Floodway, a total distance of 3 to 4 miles. The thickness and permability of the Cahokia Alluvium varies greatly between the ridges and swales, terraces



Reprinted from Ref. No. 10

Figure 1. Drainage System of the American Bottom

and swamps across the American Bottom. Its thickness can vary from 0 to 25 ft.

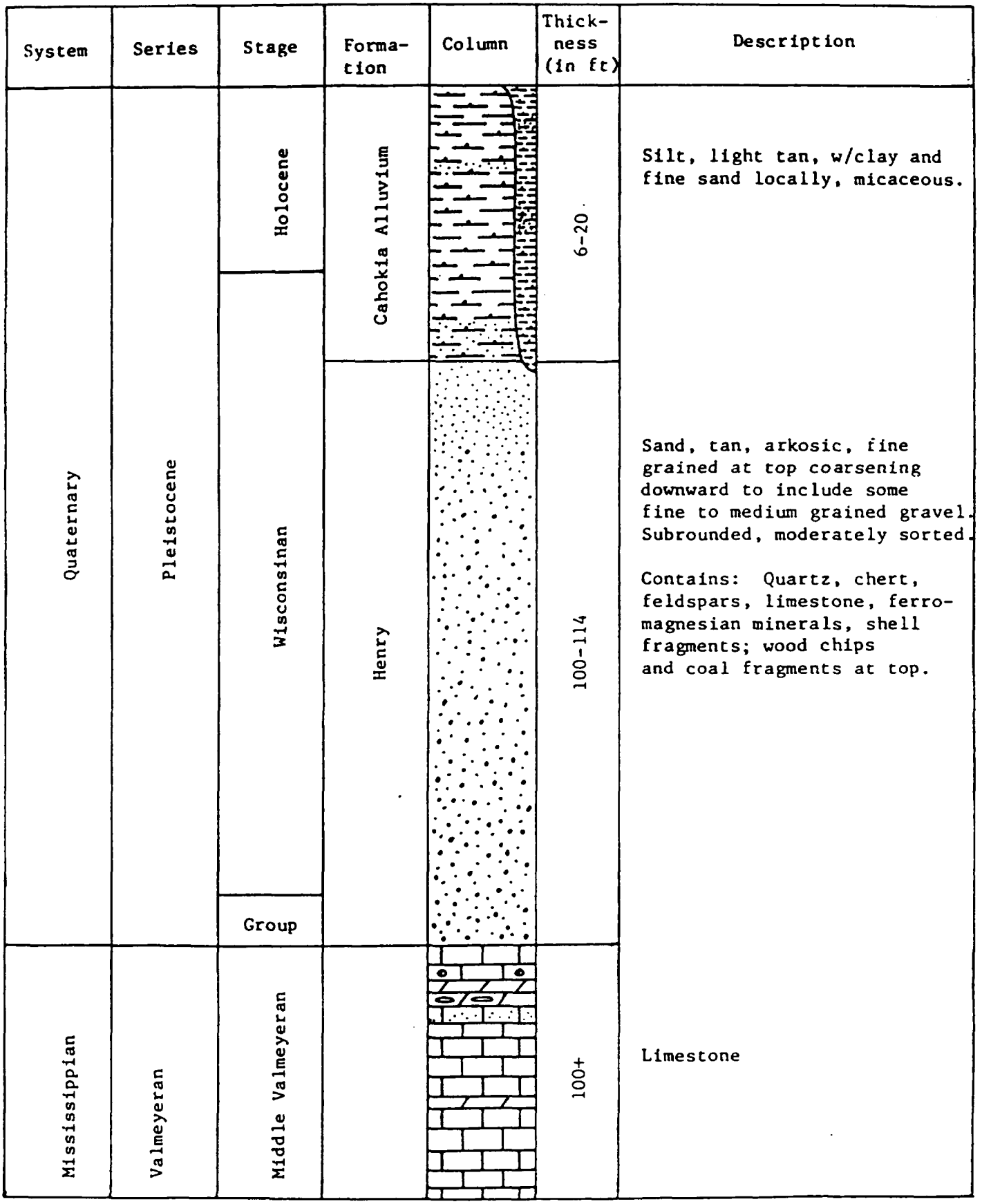
C. GEOLOGY

The site is located in the Mississippi River Floodplain on alluviual deposits approximately 120 ft in thickness. These deposits are classified into two formations: the Cahokia Alluvium, a thin surficial mantle of unconsolidated, poorly sorted silt containing sand and clay lenses; and the Henry Formation, a thick layer of glacial outwash consisting primarily of well sorted, arkosic, gray fine to medium sand with little gravel (Figure 2). The Henry Formation accounts for most of the valley fill thickness and is the major aquifer for the East St. Louis area. The Henry Formation becomes more coarse and permeable with depth.

Mississippian-age limestone is encountered at approximately 120 ft depth below the valley fill deposits at the site. The bedrock topography has a relief of about 40 ft across the American Bottom and its width varies from 0.5 to 1.5 miles trending in a north - northeast direction, similar to the Mississippi River today.

The bedrock generally consists of cyclic deposits of limestone, sandstone and shale, with a predominance of limestone. In the upland areas to the east of the site, Pennsylvanian-age bedrock has resisted erosion by the meandering Mississippi River and outcrops at the surface. These uplands contain a thin cap of Pennsylvanian sandstones, siltstones and shales overlying easily-solutioned Mississippian limestone that contain many karstic features. The bedrock structure is locally controlled by a north-northwest-trending fold known as the Waterloo anticline. The bedrock dips gently to the east-northeast away from the anticline.

Local subsurface conditions near the site were detailed in a 1981 IEPA report titled, "A Preliminary Hydrogeologic Investigation in the Northern Portion of Dead Creek and Vicinity," by Ron St. John. The field work generally confirmed the typical geologic conditions as previously described.



Reprinted from Ref. No 11

Figure 2. Generalized Geologic Column for unconsolidated deposits to bedrock in the Dead Creek area.

The study found that the Cahokia Alluvium varied in thickness from 6 to 17 ft across the site and became thinner toward the east. The alluvium generally consisted of light brown to tan silt, with occasional gray clay and sand lenses, and became sandy near its base. Laboratory permeability values were measured on the order of $7x10^{-6}$ cm/sec in this layer.

The Henry Formation was found to be gray sand, fine - to coarse-grained, loose to medium dense, to a maximum boring depth of 35 ft. The sand was generally very fine - to fine-grained and uniform above 25 ft depth. An average laboratory permeability value of $4x10^{-3}$ cm/sec was obtained from two tests performed on representative sand samples.

Hand auger borings within the bed of Dead Creek found a relatively thick deposit of soft clayey silt to silty clay. This layer extended from 7 to 9 ft below the creek bottom, or to a depth of 15 to 16 ft below the ground surface. This deposit generally extended through the surficial Cahokia Alluvium and into the Henry Formation. The permeability of this creek bottom deposit may be on the order of $1x10^{-6}$ cm/sec.

The water table, or phreatic surface, was found within the Henry Formation at a depth ranging from 13 to 18 ft below the surface. These measurements were made during a time of drought. The water table depth can be expected to rise 3 ft or more after sufficient recharge from precipitation occurs. The Henry Formation, can, therefore, exhibit either a water table or a leaky artesian boundary condition, or both, depending on the thickness and permeability of the surface silt mantle, and the general elevation of the phreatic surface during a particular season.

D. HYDROGEOLOGY

Large quantities of potable groundwater are obtained from the clean sands of the major regional aquifer, the Henry Formation. Individual well yields commonly exceed 500 to 1,000 gallons per minute (gpm). With depth, the aquifer sands become more coarse with fine gravel, and the aquifer permeability increases from 10^{-3} to over 10^{-1} cm/sec (100 to over 2,000 gpd/sq ft). Aquifer transmissivity ranges from 50,000 to

over 300,000 gpd/ft across the American Bottom. Local transmissivities may exceed 300,000 gpd/ft (Schicht, 1964). A pump test performed by Monsanto Co. in 1952 determined a transmissivity of 210,000 gpd/ft, a storativity in the water table range at 0.082, and a permeability of 2,800 gpd/sq ft (0.13 cm/sec), typical for a clean sand and gravel aquifer.

The water-bearing Mississippian-age limestone and sandstone bedrock layers can provide small to medium groundwater supplies (10 to 50 gpm) where these layers are recharged from the unconsolidated Henry Formation aquifer above. However, because more accessible groundwater supplies of better water quality can generally be obtained from the Henry Formation sands, bedrock aquifers are not currently being exploited in the area.

Groundwater in the Henry Formation aquifer occurs under both leaky artesian and water table conditions. In other words, the phreatic (water table) surface can be found within the semi-confining Cahokia Alluvium silts or within the Henry Formation sands across the region. Large groundwater pumpage is responsible for reducing piezometric levels in many areas below the Cahokia Alluvium and forming water table conditions within the aquifer. Other factors affecting piezometric levels include the elevation of the Mississippi River and local precipitation.

Piezometric elevations at the site are greatly influenced by local industrial groundwater users. In 1980, the phreatic surface averaged 14 ft in depth. However, in the 1950s local piezometric elevations were 30 to 40 ft lower because of industrial pumpage of 30 million gallons per day (mgpd). Local pumpage in 1980 had decreased to 16 mgpd, and has continued to decrease since then. Records prior to 1900 indicate that local piezometric levels could recover 7 ft depth or less if local groundwater pumpage ceased.

The regional groundwater flow gradient is approximately 3 ft in 1,000 ft to the west, but with apparent local fluctuations. Groundwater flow velocities may range from 50 to 150 ft/yr within the shallow, fine to medium sand section of the aquifer, but may increase to greater than 1,000 ft/yr within the deeper medium to coarse sand and gravel portion of the aquifer. Estimates of average aquifer parameters important to modeling the aquifer boundary conditions include precipita-

tion recharge of 300,000 to 475,000 gpd/sq mi, subsurface flow from the upland bluff of 330,000 gpd/mi and induced infiltration from the Mississippi River of 37,500 to 340,000 gpd/acre/ft (Schicht, 1965).

Water quality within the aqufier varies across the American Bottom. In many areas, the groundwater has high concentrations of iron, manganese, and calcium and magnesuim carbonates that can cause incrustation of well screens. Well incrustation and sand infiltration have reduced the average well service life within the American Bottom to less than 20 years. Typical ranges of selected water quality parameters are: hardness 350-800 ppm, chloride 10-60 ppm, sulfate 150-500 ppm, and iron 5-20 ppm.

Groundwater usage locally and throughout the region has been reduced greatly since its peak in the 1950s. The following table illustrates this fact (Emmons, 1979).

Year	Groundwater Usage (mgpd)
1900	2.1
1956	111.0
1961	99.4
1971	79.5
1977	65.3

In 1971, it was estimated that 0.4 to 0.9 mgpd was used for irrigation, 2.4 mgpd for domestic supplies, and 7.7 to 10.5 mgpd for municipal supplies. Local industrial usage had been reduced from 30 mgpd in the 1960s to 16 mgpd in 1980.

The site groundwater flow direction, gradient and velocity are greatly influenced by groundwater usage in the Sauget area. Flow gradients outside these high usage areas average 4 to 5 ft per mile. However, the local flow gradient within the Sauget area has been increased to approximately 10 to 30 feet per mile and the flow direction is toward high yield industrial wells. The area of groundwater flow diverted toward the Sauget pumping center was 17.33 sq mi in 1971; it was reduced to 11.68 sq mi in 1977. This diversion area includes the Cerro Copper Products Plant. It is estimated that site piezometric levels were decreased approximately 7 ft below natural normal levels in 1980 because of local groundwater usage and droughty weather conditions. Information on current usage and its affect on piezometric levels is not

readily available. A detailed study involving the local users would be required.

III EXISTING INFORMATION REVIEW AND HISTORY OF RESPONSE ACTIONS

Response actions in the Dead Creek area began in the early 1970's. IEPA records indicate that in 1971, a yellow discharge in Dead Creek was brought to the attention of State and local officials. Waggoner Trucking Co. was suspected, however, evidence to support this conclusion was not available. A possible discharge from Cerro Copper or Monsanto was also investigated but field investigations indicated the culvert under Queeny Avenue was blocked and the grade of the stream bed caused water on the north side of Queeny to flow to the north to a catch basin. The source of the discharge was not determined and additional investigation was not conducted.

Later in 1971, Waggoner Trucking Co. tanker trucks labeled corrosive were observed discharging contents to the creek. Waggoner responded that the discharge to Dead Creek would be stopped and future disposal would be in a quarry pit on his property. No further action from the IEPA occurred until 1973 when additional discharge by Waggoner was observed. Response from Mr. Waggoner was that tanker truck wash-water was being discharged into a circular hole approximately 100 yards behind their office. No additional actions by the state are recorded.

IEPA records indicate that in 1975, another public complaint was investigated concerning Cerro Copper discharging to Dead Creek. Again a hydraulic link between Dead Creek and the blocked channel on Cerro's property was not determined and further work was not conducted. The source of the discoloration observed in the creek was not determined.

In 1980, the site began attracting greater attention with reports of smoldering materials in the creek and a report that a resident's dog had rolled in the creek and died of apparent chemical burns. Sediment samples were obtained by the IEPA and analysis indicated the presence of lead, phosphorous and PCBs. A snow fence was installed by the Illinois Department of Transportation around the section of creek between Queeny Avenue and Judith Lane in an effort to limit access. In 1982, this was upgraded with a chain-link fence.

A preliminary hydrogeologic investigation was conducted of the area in 1980 and 1981 to determine locations of possible disposal, and impacts on the groundwater, soils and plants in the area. Results of this study are reported in "A Preliminary Hydrogeologic Investigation in the Northern Portion of Dead Creek and Vicinity" written by Ron St. John. The investigation documented contamination of soil, surface water, and groundwater. Being preliminary in scope, the investigation posed more questions than it answered, noting that the presence of hazardous substances in the area is likely to be widespread.

In the fall of 1984, the IEPA bid a limited clean-up project to remediate a portion of Dead Creek and the area south of Queeny Avenue and west of the creek. The Agency reconsidered this project in December of 1984 and decided that the Sauget area including Dead Creek required a thorough investigation prior to clean-up. It was determined that a full-scale Remedial Investigation/Feasibility Study (RI/FS) was needed.

The Dead Creek project, renamed the Sauget Sites project, was expanded in the spring of 1985 to include 18 potential hazardous waste dump sites, which included six sections of Dead Creek. In November of 1985, Ecology and Environment, Inc. (E&E), the IEPA selected contractor, began the detailed study.

In June of 1986, IEPA requested E&E to submit a proposal to revise the scope of work for the RI/FS. The revisions concentrated on developing the necessary data base to place the sites on the National Priorities List (NPL) or the State Remedial Action Priority List (SRAPL). Placement on the NPL and/or SRAPL would allow Superfund and Illinois Hazardous Waste Fund monies to be made available for the necessary remedial activities. The proposal was accepted and field work conducted in 1987 was structured to develop this data base. In June 1987, IEPA suggested to E&E the idea of dropping the Feasibility Study completely. This would allow the use of the additional contracted funds to be used for the RI phase. It is believed that this idea was finalized in July 1987 and the additional money will be used for the Hazardous Ranking System (HRS) package and the RI.

The following is a description of each site and the work conducted to date:

SITE A

Site A is the northern portion of Dead Creek between the Monsanto Krummrich Plant and Queeny Avenue. It is located on property currently owned by Cerro Copper Products.

Prior to 1970, regulatory officials believe the creek received discharge from Monsanto, Cerro Copper and other industries in the area. Currently, this section of the creek is not a contiguous portion of Dead Creek as the culvert under Queeny Avenue was sealed off in the early 1970's. The creek bed was regraded to the north and all drainage flows to a concrete catch basin and directed to an interceptor sewer on Monsanto property. Flow ultimately drains to the Sauget Wastewater Treatment Plant.

Samples of the surface water and sediment in Site A were obtained during the Preliminary Hydrogeologic Investigation conducted by the IEPA in 1980 and 1981 and the results are reported in the "St. John Report". The surface water from the creek contained cadmium, copper, lead, mercury, nickel, phosphorus, silver and zinc. PCBs were detected and the total aliphatic hydrocarbons concentration for one of the samples was 23,000 ppb. The sediment samples contained the same parameters as well as detectable levels of dichlorobenzene (1.7 ppm).

Additional sediment and water samples were collected by E&E in November, 1986, as part of their RI study. Sample locations are shown in Figure A-1. Samples were split with Cerro representatives, however, the split samples were not analyzed. Draft results of E&E's testing are shown in Table A-1. Inorganic data on the samples are not available at this time.

One groundwater sample obtained during the preliminary study contained measurable levels (over background) of metals and detectable levels of priority pollutant organics. The source of the contamination cannot be linked directly with the creek since the proximity of other potential sites will also influence the water quality found in this well. Additional monitoring wells installed by E&E adjacent to the creek are addressed in the write-up on Site I.

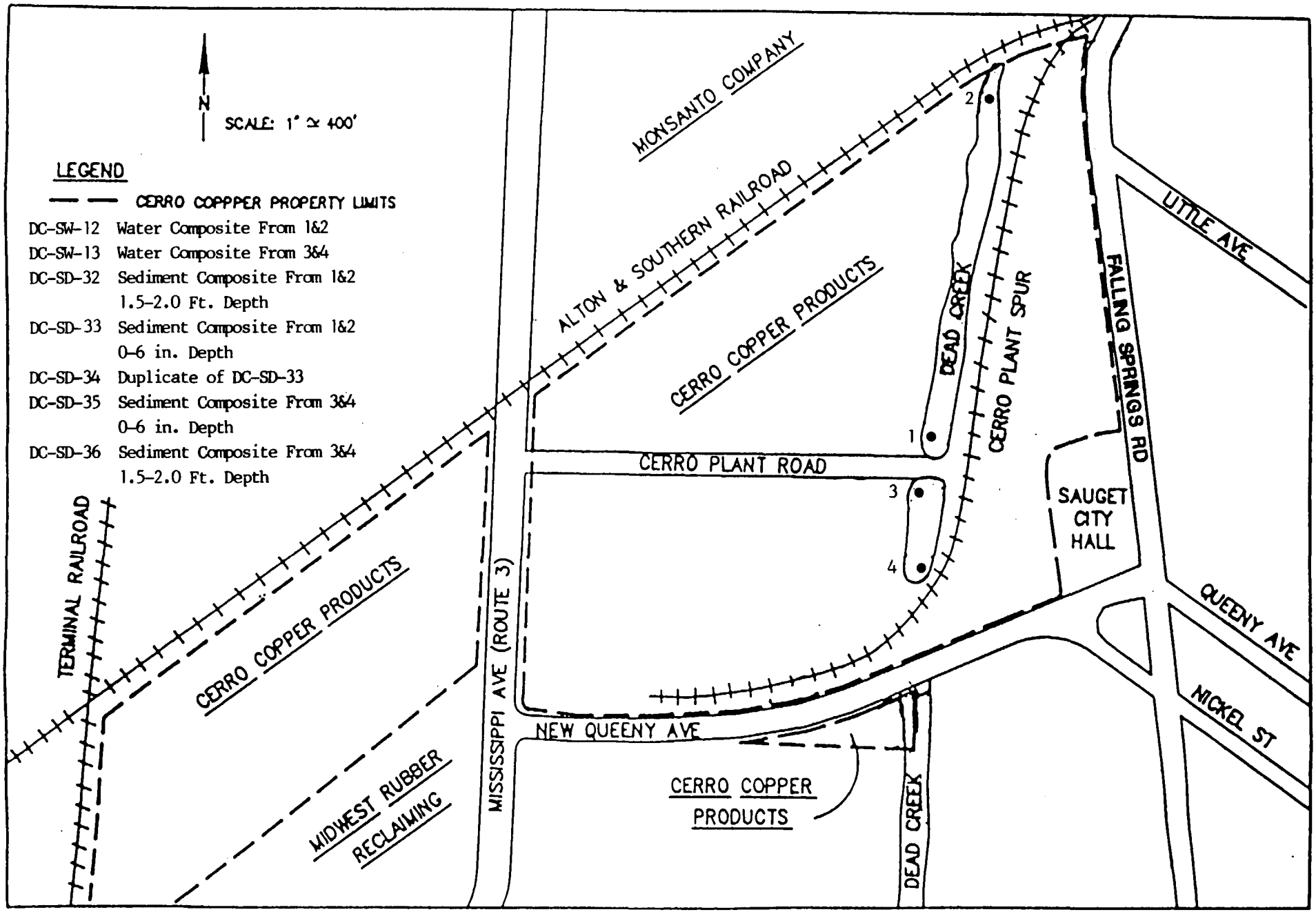


FIGURE A-1

SITE A SAMPLING LOCATIONS

TABLE A-1
SEDIMENT & SURFACE WATER
PRELIMINARY DATA FOR SITE A, UG/KG*

	Sediment					Water	
Parameter	DC-SD-32	DC-SD-33	DC-SD-34	DC-SD-35	DC-SD-36	DC-SW-12	DC-SW-13
Methylene Chloride	14000B	6300B	6600B	8800B	7200B	4BJ	4
Acetone	11000B	12000B	5300B	23000B	6000B	20B	6
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	3
Chloroform	ND	ND	ND	ND	ND	8	7
2-Butanone (MEK)	12000B	11000B	9200B	ND	12000B	ND	ND
1,1,1-Trichloroethene	ND	ND	ND	ND	ND	33	41
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	31
Trichloroethene	ND	ND	ND	ND	ND	6	16
Benzene	ND	ND	ND	ND	ND	1J	ND
4-Methyl-2-Pentanone	ND	ND	ND	ND	ND	6J	ND
2-Hexanone	ND	ND	930JB	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	400J	2J	ND
Total Xylenes	ND	ND	ND	ND	ND	2J	ND
1,3-Dichlorobenzene	160J	ND	ND	ND	550J	ND	ND
1,4-Dichlorobenzene	1000	ND	410J	130J	2900	ND	ND
1,2-Dichlorobenzene	400	270J	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	500	ND	ND	90J	1500J	ND	ND
Naphthalene	ND	ND	ND	130J	ND	ND	ND
4-Chloroaniline	ND	ND	ND	1000J	ND	ND	ND
2-Methylnaphthalene	ND	ND	450J	ND	ND	3J	ND
Acenaphthene	ND	ND	ND	ND	170J	ND	ND
N-Nitrosodiphenylamine	220J	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	110J	ND	ND	1100J	ND	ND	ND
Pentachlorophenol	ND	ND	ND	800J	ND	ND	ND
Phenanthrene	190J	ND	ND	ND	ND	4J	ND
Di-n-butylphthalate	ND	ND	ND	ND	900J	5BJ	ND
Fluoranthene	ND	ND	ND	600J	ND	ND	ND
Pyrene	110J	ND	ND	1000J	1400J	ND	ND
Butyl Benzyl phthalate	520	ND	2400J	ND	ND	12J	ND
bis(2-ethylhexyl) Phthalate	200J	2200J	2900	130J	ND	7J	ND
Chrysene	110J	ND	710J	1000J	1700J	ND	ND
Di-n-octyl phthalate	300J	420J	2900	8100	11000	36J	ND
Benzo(b) Fluoranthene	ND	ND	330J	760J	1000J	ND	ND
Benzo(a) Pyrene	ND	ND	ND	430J	540J	ND	ND
Indeno (1,2,3-cd) Pyrene	ND	ND	ND	570J	ND	ND	ND
Dibenzo (a,h) Anthracene	ND	ND	ND	960J	ND	ND	ND
Aroclor-1248	21000C	7900	11000	ND	ND	ND	ND
Aroclor-1254	13000JC	6500	10600	71000C	30000	ND	ND
Aroclor-1260	ND	2000J	2200J	24000C	13000J	ND	ND

* Preliminary data from IEPA/EEE. Data was stamped "Draft-Subject to Revision". Data retabulated from best available copy.
B - Parameter was in the blank as well as the sample.
J - Estimated value.
C - Confirmed value by GC/MS.

126J/JOB 0

SITE B

Site B is the portion of Dead Creek between Queeny Avenue and Judith Lane. The banks of the creek are heavily vegetated and debris is scattered throughout the northern one-half. Culverts at Queeny Avenue and Judith Lane have been blocked to prevent any release of contaminants, however, the effectiveness of the seal has been questioned.

Concerns of contamination in Dead Creek began in the early 1970's with reports of dumping of hazardous truck washings by Waggoner Trucking Co. and complaints of Cerro Copper discharging contaminants into the creek. The reports of discharging by Cerro were citizen complaints of contamination (discoloration) downstream. The incidents were investigated but the point of discharge was not located. Conclusive evidence was not available that the sealed culvert under Queeny Avenue was leaking and water from Cerro's property was observed to flow north, to a Monsanto storm sewer. The source of the observed discoloration was not determined and further study was not conducted.

In August, 1980 a local resident's dog reportedly died from chemical burns resulting from contact with the materials in the creek. As a result of this incident, sediment samples were taken for chemical analysis. This analysis detected PCBs (120 ppm), phosphorous (120,000 ppm), and lead (2,400 ppm). The IEPA soon after authorized fencing the area to limit access. A snow fence was installed around the creek section by the Illinois Department of Transportation in September of 1980. This was upgraded to a chain link fence in 1982.

The results from the preliminary hydrogeologic study conducted by the IEPA in 1980 indicated PCB concentrations in the ditch sediment as high as 10,000 ppm. Subsurface samples obtained from the creek indicated 9,200 ppm PCBs near the surface to 53 ppm at depths between 4 and 7 feet. Other organics which were found at concentrations in the hundreds and thousands of ppm at the 3 foot level included biphenyl, dichlorobenzene and trichlorobenzene.

In October of 1980, the IEPA and Monsanto cooperatively collected three additional sediment samples from Site B to confirm results of earlier sampling. PCBs (45-13,000 ppm) and chlorinated benzenes were found in all three samples and chlorinated phenols and phosphate esters were detected in two of the three samples.

In December, 1982, as part of an area-wide dioxin sampling effort managed by the USEPA, two more sediment samples were collected from Site B. Both samples were analyzed specifically for 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD). One sample was below detection limits and the other showed a quantified level (0.54 ppb) of TCDD. Although detectable, this level is generally not considered a health concern by regulatory agencies. No additional work, directly related to the dioxin samples is recorded.

Water samples from monitoring wells installed adjacent to the creek indicate inorganic constituents in the subsurface water. Copper (0.97 ppm), lead (0.32 ppm), phosphorus (10 ppm), and silver (0.02 ppm) were detected at levels above Illinois General Water Use Standards in one or more of the wells. Iron and mangenese were also detected but these are believed to be natural concentrations found in the area.

Additional samples were obtained by E&E in 1987 to further characterize the site. Draft results of this effort indicate the sediment contains PCBs, PAHs, and chlorinated benzenes. Surface water samples indicated little to no organic contamination except for detectable levels of PCBs in the low ppb range. Inorganic results are not available at this time.

SITES C THROUGH F

Sites C through F include the reaches of Dead Creek south of Judith Lane to its discharge into Old Prairie DuPont Creek. The creek sectors have been identified as follows: C-Judith Lane to Cahokia Street, D-Cahokia Street to Jerome Street, E-Jerome Street to the intersection of Route 3 (Mississippi Avenue) and State Route 157, F- the intersection of Route 3 and Route 157 to Old Prairie DuPont Creek.

There are no known discharges to the sections of Dead Creek south of Judith Lane except for surface runoff. The culvert under Judith Lane has been blocked to prevent flow from the upper reaches, however, the effectiveness of the seal has been questioned by local residents and regulatory officials. Flow from the culvert has been reported on several occasions.

The IEPA collected five sediment and two surface water samples from the creek as part of their Preliminary Hydrogeologic Study performed in 1980 and 1981. The surface water samples were taken from sections C and E and indicated very little contamination. A level of 1 ppb of PCBs was detected in Section C and copper levels (0.26 and 0.04 ppm) were above general water use standards in both sectors.

The sediment samples contained measurable concentrations of heavy metals. The highest levels detected being: cadmium-50 ppm, chromium-400 ppm, copper-17,200 ppm, lead-1,300 ppm, nickel-2,300 ppm and zinc-21,000 ppm. The only organics detected in the sediments were PCBs, which were detected in all of the samples but the one taken from Section F. The highest level of PCBs detected was 2.8 ppm, found in a sample taken south of Jerome Street in Section E.

Draft results from additional sampling conducted by E&E in creek sections C and D indicate levels of PAHs, chlorinated benzenes and PCBs similar to those in Section B. Inorganic data on these samples is not available at this time. Sections E and F were not sampled during this phase. Surface water samples from the creek did not indicate detectable organic contamination.

SITE G

Site G is a parcel of land, approximately 4.5 acres, located south of Queeny Avenue; west of Dead Creek; east of Wiese Engineering company and north of a cultivated field. Aerial photographs indicate the site was utilized as a sand and gravel borrow pit prior to 1950 (see Appendix II). Following excavation, it is believed the site was used as a disposal area.

Currently, the site is littered with debris. Two small pits are located in the northeast section of the site. Oily and tar-like wastes and rusted drums are also in these areas. Drums have also been found along the southern perimeter and along a mounded area at the western edge.

A large depression is found immediately south of the mounded area. A 1921 drawing originally developed by Darling & Company, and now owned by Cerro Copper, shows an uncultivated area labeled as an "oil

overflow" in the same approximate location. In 1921 the western portion of the property that is now the Monsanto Krummrich Plant was owned or operated by Indiahoma Refining Company. The drawing indicates an oil sump or pond on the refinery property and it appears when the sump overflowed the release of oil eventually collected in the low area labeled "oil overflow." The current existence of residual from the overflow is unknown; however, the potential exists that contamination is still present.

The northern portion of Site G, approximately 0.75 acres, is currently owned by Cerro Copper Products. The property was originally purchased by Lewin-Mathes Company (now Cerro Copper) in 1946 along with other portions of the plant property. This tract was transferred to the Village of Monsanto (Village of Sauget) in 1948 for public right-of-way purposes and it is believed to have remained Village property until Cerro Copper reacquired the land from the Village in 1969. The operator of the excavation and disposal activities during the late 1940s and 1950s is unknown.

Subsurface water samples, obtained in 1980 and 1981 by the IEPA during their preliminary study, contained chlorophenol (1,200 ppb), dichlorophenol (890 ppb), chlorobenzene (63 ppb), dichlorobenzene (25 ppb), and PCBs (3.9 ppb) in one or more of the wells. Heavy metals including arsenic, barium, copper and lead, were also detected. Soil samples obtained during the boring of two of the monitoring wells were also analyzed and results indicate heavy metals and PCBs. PCBs were detected down to a level of 13 feet. No other organic parameters were analyzed.

Three additional soil samples from Site G were obtained by the IEPA in 1984. These samples were obtained from and adjacent to one of the oily pits in the northeast corner of the site. Heavy metals were found in all of the samples as were various organic contaminants. PCBs (18 ppm) were detected in the sample taken adjacent to the pit. The PCB concentration of the two pit samples were below detectable levels. The pit samples did contain various other organic contaminants, such as; aliphatic hydrocarbons (19,200 ppm), chlorobenzene (0.58 ppm), dimethyl phenanthrene (3,100 ppm) and trimethyl phenanthrene (1,400 ppm).

As part of the Dead Creek RI/FS project, E&E conducted a geophysical investigation of the site in December of 1985. The magnetometer survey showed a major magnetic anomaly over most of the northern portion of the site indicating the possibility of significant quantities of buried metals. An electromagnetics (EM) survey also showed intense anomalies over the northern portion. Negative anomalies were recorded in the center of the fill area possibly indicating large quantities of non-conductive material, such as concrete. The EM survey also showed anomalies leading off-site to the northwest, indicating the possibility that the original excavation extended under what is now Queeny Avenue.

In November of 1986, E&E conducted a surface sampling program at Site G. A grid was laid out at the site and samples were obtained from the top six inches of soil. Samples were screened utilizing an organic vapor analyzer (OVA) and selected samples were analyzed for volatile and semi-volatile priority pollutants, PCBs and pesticides. E&E's results indicate organic contamination present over much of the site. Levels of pentachlorophenol reached 21,000 ppm and total PCBs reached 19,100 ppm. Octachlorodibenzo-dioxin levels were also tentatively identified in samples up to 130 mg/kg.

It appears that only one of the samples obtained from the northern portion of property owned by Cerro Copper was analyzed. It is assumed this is because field screening did not indicate significant contamination. The one sample that was analyzed contained various PAHs, chlorinated benzenes, pentachlorophenol, and PCBs. These compounds are not readily detected by field screening. Therefore, it should not be assumed the unanalyzed samples are clean based on the screening results alone.

E&E notified the EPA of the organic contamination at Site G as soon as the results became available and recommended that the site be considered an immediate threat or considered for a public health advisory. The IEPA notified the USEPA about the results and requested their assistance in securing the area. It should be noted that although the IEPA felt the site needed to be secured they did not want the method used to affect the HRS scoring for the National Priorities List (NPL). The disturbance or covering of the soil surface was not desired since

this would affect air monitoring that was scheduled for the spring of 1987. The USEPA responded to the state request by recommending fencing and covering the exposed materials. The cover was to be delayed until after the air monitoring.

On April 24, 1987, the landowners and potentially responsible parties were asked to participate financially in the fencing operation. Monsanto notified the USEPA that they would take the lead and supply field crews and materials to install a fence around Site G. The fencing was completed in May of 1987.

The air monitoring was conducted by E&E at Site G on July 16 and 17, 1987. Results of this testing is currently unknown. To date, covering of the area has not taken place.

In January of 1987, E&E installed two additional monitoring wells on the portion of Site G owned by Cerro Copper. Samples were collected during the boring and a third bore hole was sampled also (see Figure 4). Samples were split with Cerro's representative and were analyzed for priority pollutants. Preliminary results from Cerro and E&E are shown in Tables G-1 through G-3.

Groundwater samples obtained from the two wells also indicated many of the same organic constituents as found in the soils. These results are included in Tables I-5 through I-7 of the Site I discussion.

SITE H

Site H is located southwest of the intersection of Queeny Avenue and Falling Springs Road. Aerial photographs suggest the site was initially utilized as a sand and gravel borrow pit and later used as a disposal area (see Appendix II). Currently the area is filled and vegetated with no visible signs of waste disposal.

Monsanto Company submitted a "Notification of Hazardous Waste Site" form to the US EPA in 1981. The notification listed the site as the Sauget (Monsanto) Illinois Landfill and indicated the disposal of drummed organics had occurred until 1957. The Monsanto Company's Queeny Plant in St. Louis, Missouri also filed a similar notice. It is believed this may be the same disposal site as Site H since the notification indicated the location as Falling Springs Road.

TABLE G-1

VOLATILE ORGANICS AND PESTICIDES/PCBS

PRELIMINARY SUBSURFACE SOIL DATA FROM SITE G. ug/kg

PARAMETER		DC-G1-13	DC-G2-34	DC-G4-25	DC-G4-36	DC-G5-27
METHYLENE CHLORIDE	(1)	693	4BJ	3BJ	3BJ	851BJ
	(2)	19	16	20B	ND	1000
ACETONE	(1)	10002B	20B	1900EB	2250EB	3302B
	(2)	2900	ND	1500	6500	1600
2-BUTANONE (MEK)	(1)	2993	ND	22B	15B	3503
	(2)	ND	ND	12	61	3000
TRICHLOROETHENE	(1)	ND	ND	ND	ND	762J
	(2)	ND	ND	ND	ND	260
BENZENE	(1)	34J	ND	3J	5J	10160
	(2)	10	ND	ND	ND	11000
4-METHYL-2-PENTANONE	(1)	ND	ND	ND	ND	635J
	(2)	ND	ND	ND	ND	ND
TETRACHLOROETHENE	(1)	40J	ND	ND	ND	3556
	(2)	ND	ND	ND	ND	6400
TOLUENE	(1)	ND	ND	ND	ND	27940
	(2)	ND	ND	ND	ND	52000
CHLOROBENZENE	(1)	3014	ND	107	150	2413
	(2)	1500	ND	38	62	2800
ETHYLBENZENE	(1)	274	ND	ND	ND	1245J
	(2)	ND	ND	ND	ND	1700
TOTAL XYLENES	(1)	92	ND	ND	ND	2794
	(2)	ND	ND	ND	ND	3900
ALPHA-BHC	(1)	ND	ND	ND	ND	ND
	(2)	36	ND	ND	ND	ND
GAMMA-BHC (lindane)	(1)	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND
HEPTACHLOR	(1)	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND
AROCLOR-1260 (PCB)	(1)	ND	1792J	ND	ND	57150
	(2)	--	--	--	--	--
PCBs (Total)	(1)	--	--	--	--	--
	(2)	1600**	ND	120J**	140J**	2100**

(1) Preliminary data from IEPA/E&R. Data was stamped "Draft-Subject to Revision". Data was retabulated from best available copy.
(2) Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinios. Data has not received QA/QC check independent of laboratory.
ND Not detected.
J Estimated Value. Below contract required detection limit.
B Parameter was in the blank as well as the sample.
-- Sample was not analyzed for this specific parameter.
** Mixture of Aroclors 1254 & 1260

TABLE G-2
SEMIVOLATILE ORGANICS / PRELIMINARY SUBSURFACE SOIL DATA FROM SITE G, ug/kg

PARAMETER		DC-G3-33	DC-G8-34	DC-G4-35	DC-G4-36	DC-G5-37
PHENOL	(1)	ND	ND	ND	ND	177000
	(2)	ND	ND	ND	ND	97000
2-CHLOROPHENOL	(1)	ND	ND	ND	ND	8763
	(2)	ND	ND	ND	ND	ND
1,4-DICHLOROBENZENE	(1)	ND	ND	2376	3750J	ND
	(2)	ND	ND	730	580	3300
BENZYL ALCOHOL	(1)	ND	ND	ND	ND	6095J
	(2)	ND	ND	ND	ND	38000
2-METHYLPHENOL	(1)	ND	ND	ND	ND	3556J
	(2)	ND	ND	ND	ND	ND
4-METHYLPHENOL	(1)	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	7600
2,4-DICHLOROPHENOL	(1)	ND	ND	ND	ND	38100
	(2)	ND	ND	ND	ND	37000
1,2,4-TRICHLOROBENZENE	(1)	ND	ND	ND	ND	7074J
	(2)	ND	ND	ND	ND	9400
NAPHTHALENE	(1)	ND	ND	ND	ND	254000
	(2)	ND	ND	ND	ND	310000
4-CHLOROANILINE	(1)	ND	ND	ND	ND	5969J
	(2)	ND	ND	ND	ND	18000
2-METHYLNAPHTHALENE	(1)	ND	ND	ND	ND	13970J
	(2)	ND	ND	ND	ND	16000
2,4,6-TRICHLOROPHENOL	(1)	ND	ND	ND	ND	49530
	(2)	ND	ND	ND	ND	ND
N-NITROSODIPHENYLAMINE	(1)	ND	ND	ND	ND	177000
	(2)	ND	ND	ND	ND	85000
PHENANTHRENE	(1)	ND	ND	ND	ND	2E670
	(2)	ND	ND	ND	ND	29000
PYRENE	(1)	ND	ND	ND	ND	19050
	(2)	ND	ND	ND	ND	14000
BENZO(a)ANTHRACENE	(1)	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	7400
bis(2-ETHYLHEXYL) PHTHALATE	(1)	ND	ND	ND	ND	ND
	(2)	ND	ND	320J	ND	ND
CHRYSENE	(1)	ND	ND	ND	ND	22260
	(2)	ND	ND	ND	ND	19000
BENZO(b)FLUORANTHENE	(1)	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	4200
BENZO(a)PYRENE	(1)	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	6700

NOTES:

1). Preliminary data from IEPA/ERE. Data was stamped "Draft-Subject to Revision". Data was retabulated from best available copy.

2). Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinois. Data has not received QA/QC check independent of laboratory.

ND- Not Detected. Detection limit unknown.

J- Estimated value.

TABLE G-2
METALS ANALYSIS*
PRELIMINARY SUBSURFACE SOIL DATA FOR SITE G, mg/kg

PARAMETER	DC-G3-33	DC-GB-34	DC-G4-35	DC-G4-36	DC-G5-37
ALUMINUM	11000	8000	47000	5000	8900
ANTIMONY	<0.6	<0.6	<0.6	<0.6	<0.6
ARSENIC	20	12	<0.5	7.5	10
BARIUM	140	220	150	77	140
BERYLLIUM	0.53	0.36	<0.2	<0.2	0.38
CADMIUM	0.49	1.5	0.07	0.35	0.7
CHROMIUM	19	14	<2.0	8.1	15
COBALT	6.3	5.0	3.5	2.8	13
COPPER	11	24	4.4	14	15
IRON	14000	15000	7000	7300	12000
LEAD	17	41	7.2	9.5	21
MANGANESE	380	280	150	150	470
MERCURY	0.01	0.04	0.01	<0.01	<0.01
NICKEL	18	15	12	12	64
POTASSIUM	2300	2300	970	1000	1700
SELENIUM	<0.5	<0.5	<0.5	<0.5	<0.5
SODIUM	3200	100	450	300	1600
SILVER	0.80	0.50	0.2	<0.2	0.3
THALLIUM	4.9	2.3	1.4	1.8	3.4
VANADIUM	35	30	<2.0	20	36
ZINC	44	120	31	45	210
CALCIUM	9900	4300	8100	7500	6200
MAGNESIUM	5600	2900	3500	3400	4600
BORON	3.6	6.0	4.1	4.2	6.4
TIN	<1.0	<1.0	<1.0	<1.0	<1.0
CYANIDE	<0.2	<0.2	<0.3	<0.2	<0.3

NOTES:

* - Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinois. Data has not received QA/QC check independent of laboratory.

As part of the Dead Creek Project, a geophysical survey, including flux-gate magnetometry and EM was conducted at Site H in December of 1985. Various anomalies were detected indicating the possibility of buried drums and contaminants. Confirmation of these preliminary findings has yet to be determined but additional borings and subsurface sampling have been completed. Draft results of additional work conducted by E&E indicate the presence of chlorinated benzenes.

SITE I

Site I is property currently owned by Cerro that is bordered on the west by Dead Creek; the north by the Alton and Southern Railroad; the east by Falling Springs Road and the south by Queeny Avenue. The section of property owned by the Village of Sauget, which is the current location of City Hall, is not included in the current investigation of Site I.

Aerial photographs suggest that portions of the site were utilized as sand and gravel pits from as early as 1937 to the mid-to-late 1950s (see Appendix II). When the borrow operations were discontinued the pits were filled in. It is believed waste materials from nearby industries were included with the fill. IEPA and their consultant believe a portion of one of the borrow pits in Site I was contiguous with that in Site H and the construction of Queeny Avenue divided this pit into separate entities. Cerro Copper personnel have indicated the sites have always been separate and material in one area may not be the same as the other. As indicated previously in the description of Site H, Monsanto Company submitted a "Notification of Hazardous Waste Site" form for disposal of drums containing organics in a landfill which may be these borrow pits. The possibility of drums and other chemical disposal is believed by IEPA and E&E to be as likely for the Site I pits as for Site H.

A review of title information indicated that Cerro bought the southern portions of the property that contains the former pits in 1967 from Rogers Cartage Company. Rogers Cartage Company bought the property from Leo Sauget in 1965. Records indicate that Leo Sauget originally bought the property in three segments, at different times, 1931, 1943,

and 1952. The last two segments were purchased from trust companies. The actual user of the property during the ownership of the trust companies is not known. It appears from the aerial photos that the pit operations continued after the formal purchases by Leo Sauget. He also owned the southern most segment from 1931 to 1965, which encompasses the time period that the excavation and filling of a borrow pit occurred in that segment.

The northern tip of Site I was purchased in two pieces by Cerro in 1967 and 1968 from Lillie Mifflin and Harold Waggoner, respectively. There is no indication of chemical waste disposal in this area.

It is believed the midsection of Site I was purchased in 1955 from Leo Sauget. There is no indication of chemical waste disposal in this area either.

The IEPA Preliminary Hydrogeologic Investigation did not address Site I except to identify the past borrow pits. Soil samples were not taken from the area. As mentioned in the discussion of Site A, one monitoring well was installed on Cerro property theoretically downgradient of Site A and Site I. Analysis of the groundwater revealed levels of copper, manganese, phosphorus, and zinc above those of background wells. Phenolics, chlorobenzene, dichlorobenzene, and chloroaniline were also detected in the water.

E&E performed a soil gas monitoring survey on Cerro property on November 19 and 20, 1986. The sampling locations are shown on Figure 3. Utilizing a slotted stainless steel point inserted into the ground, soil gas was screened using a Foxboro Organic Vapor Analyzer (OVA). Locations #9, 10, 11, 15, 16, and 19 had readings over 1,000 ppm as methane equivalents (methane being the calibration gas). Location #8 had a reading of over 100 ppm as methane and the remaining locations were less than 4 ppm as methane. Gas samples for laboratory analysis were collected at locations #15 and #18 by E&E. These samples were split with Cerro representatives but were not analyzed. The results of E&E's analysis are unknown and to date have not been made available to Cerro.

E&E conducted additional field work at the site during January and February of 1987. Fifteen borings were drilled, including one upgradient of the site, three west of Dead Creek (Site A) and three on

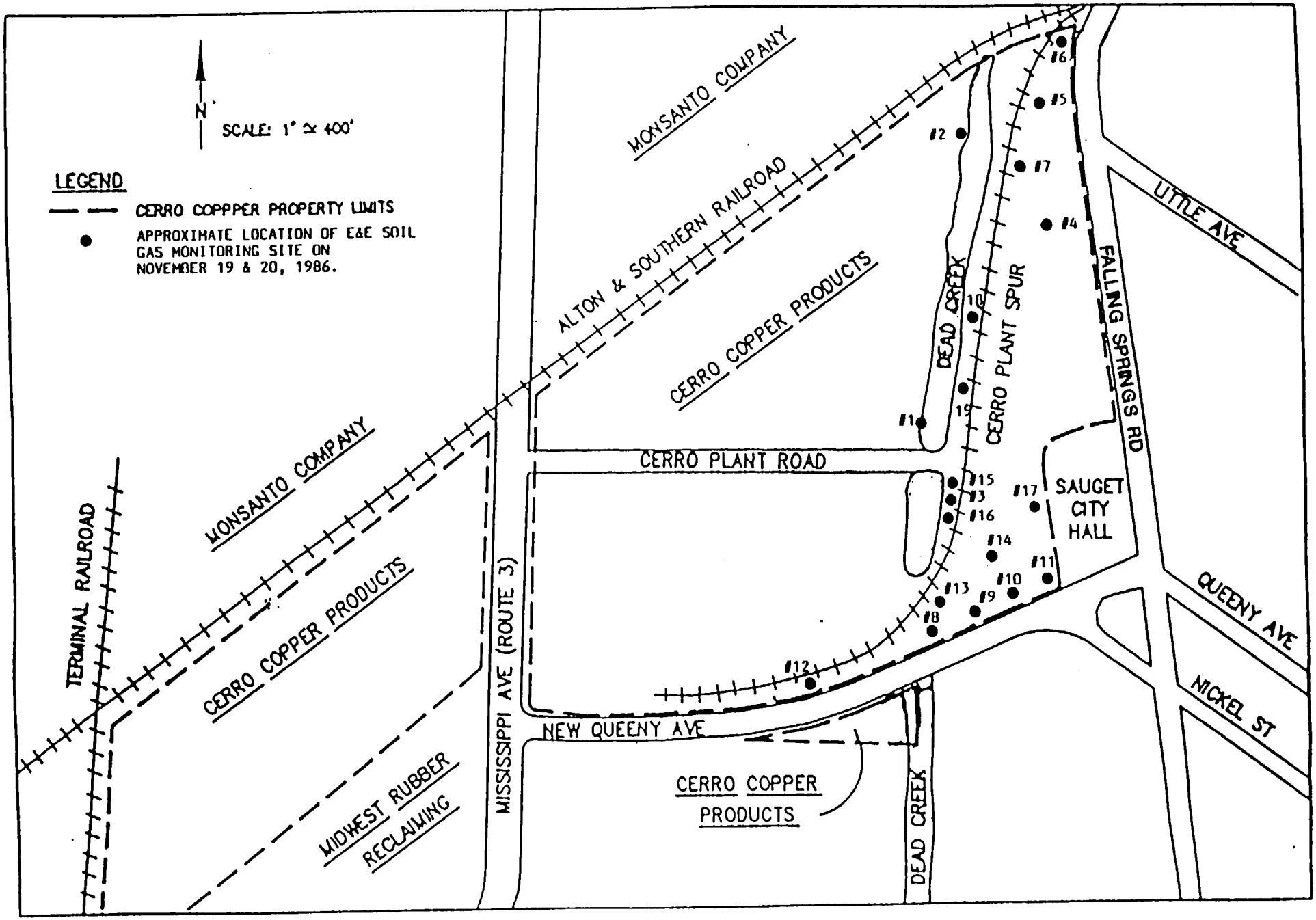


FIGURE 3

SOIL GAS MONITORING LOCATIONS

the portion of Site G owned by Cerro Copper. Nine monitoring wells were installed during the boring activities. The locations of the wells and the borings are shown in Figure 4. Soil samples obtained during the borings were split with Cerro Copper. Preliminary data from Cerro and E&E are shown in Tables I-1 through I-4.

Only four of the groundwater samples obtained from wells on their property were analyzed by Cerro Copper. These four were from EE-11, EE-13, EE-15, and EE-20. The results of Cerro's analysis and draft data from E&E are included in Tables I-5 through I-7.

SITE J

Site J consists of two pits and a surface disposal area located northeast of Cerro on property owned by Sterling Steel Foundry, Inc. One of the pits is believed to have been a borrow pit and was later filled with scrap metal, demolition debris and casting sand. The second pit was excavated in approximately 1950 and is used to collect and settle baghouse dust from the foundry furnances. The surface disposal area has been used for the disposal of casting sand, slag, scrap steel and construction debris. There is no information available indicating the disposal of hazardous material. The area is currently being investigated by the IEPA because the pits and surrounding areas have been filled with "foreign" material.

Results of geophysical surveys conducted by E&E did not indicate the possible presence of buried drums. Significant interferences were encountered due to the presence of scrap steel.

Draft data of samples taken at the site indicate possible organic contamination in the subsurface. The major organic constituents being PAHs. Inorganic data and the actual sampling locations on the site are not currently available for review.

SITE K

Site K is the location of a former sand pit. The site is located north of a residential area on Queeny Avenue, and east of Falling Springs Road. Aerial photographs indicate excavation began at

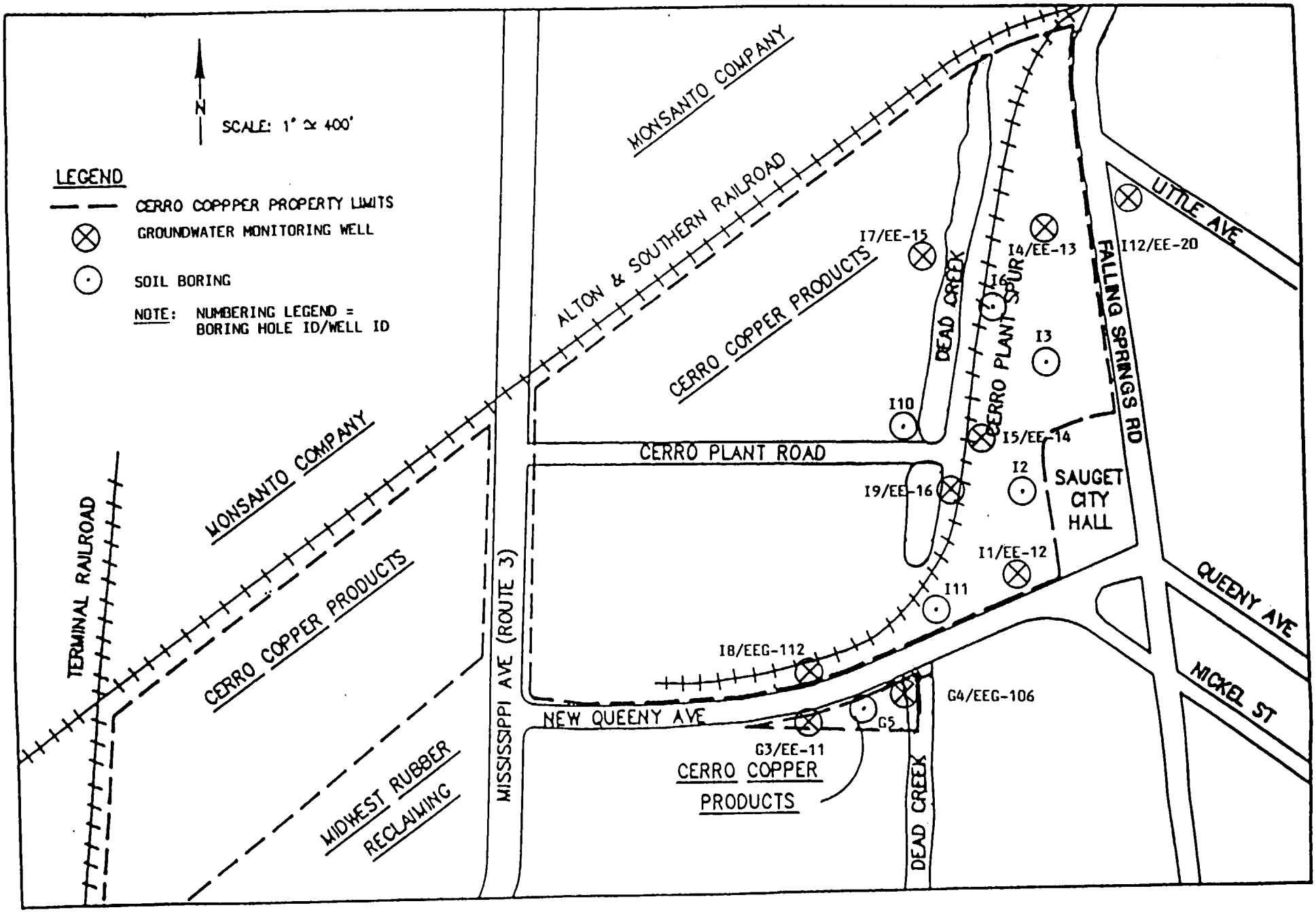


FIGURE 4

SOIL BORING LOCATIONS

TABLE I-1
VOLATILE ORGANICS
PRELIMINARY SUBSURFACE SOIL DATA FROM SITE I, ug/kg

PARAMETER		DC-I1-38	DC-I2-39	DC-I3-40	DC-I5-41	DC-I5-42	DC-I6-43	DC-I8-44	DC-I7-45	DC-I7-46	DC-I7-47	DC-I9-48	DC-I9-49	DC-I10-50	DC-I11-51	DC-I11-52	DC-I12-57	DC-I12-58
METHYLENE CHLORIDE	(1)	740BJ	2160B	6760B	5207B	5310B	1047BJ	6B	7B	15B	13B	1117BJ	418BJ	536BJ	852BJ	46B	17B	17B
	(2)	1500	610	ND	1800	2500	ND	22	27	12	41	ND	53	1700	3400	51	23	32
ACETONE	(1)	2192BJ	11300B	16920B	10541B	6726B	13398B	10BJ	1950BE	850BE	914BE	13377B	5289B	6480B	13861B	700B	1461BE	549BE
	(2)	2700	3000	ND	2000	ND	2200	12	510B	63B	150B	2000	350	1400	1500	130	5000	450
TRANS-1,2-DICHLOROETHENE	(1)	ND	ND	ND	ND	ND	ND	ND	3J	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	24	ND	ND	ND	ND	ND
CHLOROFORM	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	630	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	59	510	ND	ND	ND	ND
2-BUTANONE (MEK)	(1)	3562B	10530B	16920B	13970B	9794B	9762	18	30	ND	23	10731	4059B	8640B	14696B	160	12B	27B
	(2)	ND	ND	ND	ND	ND	ND	47	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-TRICHLOROETHANE	(1)	ND	ND	1692	ND	ND	ND	ND	ND	ND	ND	ND	ND	432J	ND	ND	ND	ND
	(2)	ND	ND	1400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TRICHLOROETHENE	(1)	ND	ND	ND	3810	ND	ND	ND	ND	ND	ND	ND	ND	648J	ND	ND	ND	ND
	(2)	ND	ND	ND	3800	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZENE	(1)	397J	5265	ND	24130	637J	2156	ND	ND	ND	ND	1000	107J	1000J	3340	23	ND	ND
	(2)	ND	5500	580	25000	980	2600	ND	ND	ND	ND	2400	50	440J	2700	30	ND	ND
4-METHYL-2-PENTANONE	(1)	ND	ND	ND	ND	ND	4150	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	18J
	(2)	ND	ND	ND	1600	ND	3000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TETRACHLOROETHENE	(1)	ND	5265	1334J	2667	2950	ND	ND	ND	ND	ND	ND	ND	612J	ND	ND	ND	ND
	(2)	ND	5800	ND	2100	3200	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-TETRACHLOROETHANE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	380J	ND	ND	ND	ND
TOLUENE	(1)	650J	7425	677BJ	24130B	1652BJ	5082	ND	ND	ND	ND	77910	1353B	3120	1837	48	ND	ND
	(2)	690	7600	ND	21000	1500	4900	ND	ND	ND	ND	124000	1200	2000	1200	28	ND	ND
CHLOROBENZENE	(1)	90420E	13500	125900	45720	14160	7854	ND	10	ND	ND	3234	935	2640	100550	2040	ND	ND
	(2)	70000	22000	73000	40000	16000	9800	ND	ND	ND	ND	ND	1300	1600	130000	8100	ND	ND
ETHYLBENZENE	(1)	15070	3375	ND	9779	3068	5082	ND	ND	ND	ND	500J	203J	8160	10355	96	ND	ND
	(2)	7700	4500	ND	10000	3800	8200	ND	ND	ND	ND	1100	350	5000	770	90	ND	ND
TOTAL XYLENES	(1)	19100	8100	ND	11049	1652	4158	ND	ND	ND	ND	857J	102	2760	16205	80	ND	ND
	(2)	11000	8600	ND	7000	2000	3600	ND	ND	ND	ND	2300	160	1900	ND	ND	ND	ND

(1) Preliminary data from IEPA/ESE. Data was stamped "Draft-Subject to Revision". Data was retabulated from best available copy.
(2) Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinois.
Data has not received QA/QC check independent of laboratory.
ND Not detected.
J Estimated Value. Below contract required detection limit.
B Parameter was in the blank as well as the sample.
E Estimated Value.

TABLE I-2
SEMIVOLATILE ORGANICS
PRELIMINARY SUBSURFACE SOIL DATA FROM SITE I, ug/kg

PARAMETER		DC-I1-38	DC-I2-39	DC-I3-40	DC-I5-41	DC-I5-42	DC-I6-43	DC-I8-44	DC-I7-45	DC-I7-46	DC-I7-47	DC-I9-48	DC-I9-49	DC-I10-50	DC-I11-51	DC-I11-52	DC-I12-57	DC-I12-58
PHENOL	(1)	ND	27000J	ND	ND	ND	15246J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	10000	ND	10000	ND	16000	ND	ND	ND	ND	ND	ND	2000	1900	ND	ND	ND
1,3-DICHLOROBENZENE	(1)	ND	18900J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	70140	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	160000	ND	ND	ND
1,4-DICHLOROBENZENE	(1)	10950J	32400	3666J	558800	22420	72300	ND	ND	ND	ND	ND	ND	ND	1837000	1595J	ND	ND
	(2)	56000	420000	6700	370000	38000	62000	ND	ND	ND	ND	23000	ND	34000	2200000	14000	ND	ND
BENZYL ALCOHOL	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	11000	ND	ND	ND	ND	ND	ND
1,2-DICHLOROBENZENE	(1)	8905J	32400	2679J	139700J	6490J	15400J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	21000	48000	4500	80000	9100	11000	ND	ND	ND	ND	ND	ND	5000	19000	4300	ND	ND
4-METHYLPHENOL	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	6200	ND	6900	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
HEXACHLOROETHANE	(1)	3014J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
NITROBENZENE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	6400	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-DIMETHYLPHENOL	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	9000	ND	ND	ND	ND	ND	ND	31000	ND	ND	ND	ND	ND	ND
BENZOIC ACID	(1)	ND	62100J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	640000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-DICHLOROPHENOL	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	9000J	ND	ND	ND	ND
	(2)	8400	ND	ND	27000	3700	6000	ND	ND	ND	ND	6500	ND	30000	ND	ND	ND	ND
1,2,4-TRICHLOROBENZENE	(1)	6713J	1485000	ND	8255000	637200E	477400	ND	ND	ND	ND	ND	ND	116400	100200	112000	ND	ND
	(2)	12000	19000000	ND	5600000	700000	240000	ND	ND	ND	ND	5500	ND	1200000	510000	180000	ND	ND
NAPHTHALENE	(1)	2277J	58050	ND	633500J	ND	446604J	ND	ND	ND	ND	514500	1845J	ND	ND	ND	ND	ND
	(2)	4700	62000	ND	56000	ND	30000	ND	ND	ND	ND	1800000	8090	ND	5900	ND	ND	ND
4-CHLOROANILINE	(1)	ND	ND	ND	43100J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	33000	30000	ND	98000	8300	40000	ND	ND	ND	ND	90000	ND	6100	13000	ND	ND	ND
4-CHLORO-3-METHYLPHENOL	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13000	ND	ND	ND
2-METHYLNAPHTHALENE	(1)	3425J	7020J	ND	58420J	ND	169400	ND	ND	ND	ND	5000	ND	ND	23300J	ND	ND	ND
	(2)	7700	8600	ND	33000	1700	92000	ND	ND	ND	ND	31000	ND	ND	2900	ND	ND	ND

TABLE I-2
SEMIVOLATILE ORGANICS
PRELIMINARY SUBSURFACE SOIL DATA FROM SITE I, ug/kg

PARAMETER		DC-I1-38	DC-I2-39	DC-I3-40	DC-I5-41	DC-I5-42	DC-I6-43	DC-IB-44	DC-I7-45	DC-I7-46	DC-I7-47	DC-I9-48	DC-I9-49	DC-I10-50	DC-I11-51	DC-I11-52	DC-I12-57	DC-I12-58
ACENAPHTHYLENE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	310000	5100	ND	ND	ND	ND	ND
ACENAPHTHENE	(1)	ND	ND	ND	ND	ND	14014	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-NITROPHENOL	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	210000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIBENZOFURAN	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5586	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	23000	ND	ND	ND	ND	ND	ND
2,4-DINITROTOLUENE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	47000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
DIETHYL PHTHALATE	(1)	ND	ND	ND	ND	ND	16340J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	17000	ND	ND	ND	ND	63000	ND	ND	ND	ND	ND	ND
FLUORENE	(1)	ND	ND	ND	ND	ND	35420J	ND	ND	ND	ND	6174	3075	ND	ND	ND	ND	ND
	(2)	ND	4900	ND	ND	ND	25000	ND	ND	ND	ND	ND	5100	ND	8500	ND	ND	ND
4,6-DINITRO-2-METHYLPHENOL	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	24000	ND	ND	ND	ND	19000	ND	ND	ND	ND	ND	ND
N-NITROSODIPHENYLAMINE	(1)	ND	45900J	ND	100330J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	7200	ND	15000	2300	ND	ND	ND	ND	ND	ND	ND	2000	3800	ND	ND	ND
HEXACHLOROBENZENE	(1)	ND	117450	ND	1270000	177000	32340	ND	ND	ND	ND	ND	ND	100000	63460	46000	ND	ND
	(2)	ND	160000	ND	550000	110000	15000	ND	ND	ND	ND	ND	ND	100000	120000	33000	ND	ND
PENTACHLOROPHENOL	(1)	191000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	310000	13000	ND	ND	ND	ND	ND	1400000	ND	25000	ND	ND	ND	ND
PHENANTHRENE	(1)	7946J	ND	ND	78260	ND	101640	ND	ND	ND	ND	12495	ND	ND	ND	1320	ND	ND
	(2)	12000	9700	ND	21000	ND	54000	ND	ND	ND	ND	42000	ND	ND	7400	ND	ND	ND
ANTHRACENE	(1)	ND	ND	ND	203200	ND	23100	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	3900	ND	12000	ND	ND	ND	ND	15000	ND	ND	1700	ND	ND	ND
DI-n-BUTYL PHTHALATE	(1)	ND	ND	ND	203200	ND	35960	9728	15600	8500	10568	ND	10332	ND	ND	11200	ND	134J
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
FLUORANTHENE	(1)	8205J	ND	ND	203200	ND	19480	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	5000	ND	ND	6600	ND	6700	ND	ND	ND	ND	17000	ND	ND	6300	ND	ND	ND
PYRENE	(1)	2877	ND	ND	ND	ND	49200	ND	ND	ND	ND	2205	ND	ND	ND	ND	ND	ND
	(2)	7300	12000	ND	13000	ND	31000	ND	ND	ND	ND	12000	ND	ND	5100	ND	ND	ND

TABLE I-2
SEMIVOLATILE ORGANICS
PRELIMINARY SUBSURFACE SOIL DATA FROM SITE I, ug/kg

PARAMETER		DC-I1-38	DC-I2-39	DC-I3-40	DC-I5-41	DC-I5-42	DC-I6-43	DC-I8-44	DC-I7-45	DC-I7-46	DC-I7-47	DC-I9-48	DC-I9-49	DC-I10-50	DC-I11-51	DC-I11-52	DC-I12-57	DC-I12-58
BUTYL BENZYL PHTHALATE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	53000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZO(a)ANTHRACENE	(1)	2466J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	6720J	ND	ND	ND	ND
	(2)	3500	ND	ND	ND	ND	ND	ND	ND	ND	ND	5200	ND	ND	2600	ND	ND	ND
bis(2-ETHYLHEXYL) PHTHALATE	(1)	15070	310503	ND	ND	ND	130900	ND	ND	2375	ND	ND	5535	ND	404303	ND	ND	ND
	(2)	9900	15000	ND	ND	ND	240000	ND	2500	1400	590	14000	ND	11000	320000	ND	ND	ND
CHRYSENE	(1)	3973J	ND	ND	ND	ND	ND	ND	ND	ND	5500	ND	ND	ND	ND	ND	ND	ND
	(2)	6800	11000	ND	12000	ND	22000	ND	ND	ND	ND	22000	ND	ND	3200	ND	ND	ND
DI-n-OCTYL PHTHALATE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	5100	ND	ND	ND	ND	10000	ND	ND	ND	ND	ND	ND
BENZO(b)FLUORANTHENE	(1)	1507J	ND	ND	ND	ND	32430	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	3500	ND	ND	ND	ND	ND	ND	3800	ND	ND	2100	ND	ND	ND
BENZO(k)FLUORANTHENE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	3500	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
BENZO(a)PYRENE	(1)	2466J	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	7400	ND	3700	ND	5400	ND	ND	ND	ND	ND	ND	ND	2700	ND	ND	ND
BENZO(g,h,i)PERYLENE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	4600	ND	ND	ND	4300	ND	ND	ND	ND	ND	ND	ND	2800	ND	ND	ND
DIBENZO(a,h)ANTHRACENE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	2100	ND	ND	ND

(1) Preliminary data from IEPA/ESE. Data was stamped "Draft-Subject to Revision". Data was retabulated from best available copy
(2) Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinios.
Data has not received QA/Qc check independent of laboratory.
ND- Not detected.
J- Estimated Value. Below contract required detection limit.
B- Estimated Value
B- Parameter was in the blank as well as the sample.

TABLE I-3
PESTICIDES / PCBs
PRELIMINARY SUBSURFACE SOIL DATA FROM SITE I, ug/kg

PARAMETER		DC-I1-38	DC-I2-39	DC-I3-40	DC-I5-41	DC-I15-42	DC-I16-43	DC-I8-44	DC-I7-45	DC-I7-46	DC-I7-47	DC-I9-48	DC-I9-49	DC-I10-50	DC-I11-51	DC-I11-52	DC-I12-57	DC-I12-58
BETA - BHC	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4200	ND	ND	ND	ND	ND	ND
GAMMA - BHC	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
(LINDANE)	(2)	ND	ND	ND	140	37	ND	ND	ND	ND	ND	2600	25	ND	ND	ND	ND	ND
HEPTACHLOR	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	310	ND	ND	ND	ND	ND	ND	25	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-4'-DDD	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	29694	6642	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17000	ND	ND	ND	ND	ND	ND
4-4'-DDT	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4305	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3700	ND	ND	ND	ND
ALPHA-CHLORDANE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	430	ND	ND	ND	ND
TOXAPHENE	(1)	ND	ND	ND	ND	ND	492000	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
AROCLOR - 1260	(1)	ND	270000J	183300	342300J	86140	ND	ND	ND	ND	ND	ND	ND	20400J	ND	ND	ND	ND
	(2)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
PCBs (TOTAL)	(1)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	(2)	19000**	ND	27000**	11000**	19000**	ND	25000**	1600**	ND	ND	24000**	2800**	ND	ND	ND	209**	ND

(1) Preliminary data from IEPA/E&E. Data was stamped "Draft-Subject to Revision". Data was retabulated from best available copy.
(2) Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinios.
Data has not received QA/QC check independent of laboatory.
ND Not detected.
J Estimated Value. Below contract required detection limit.
-- Sample was not analyzed for this specific parameter.
** Mixture of Aroclors 1254 & 1260.

TABLE I-4
METALS ANALYSIS*
PRELIMINARY SUBSURFACE SOIL DATA FROM SITE I, mg/kg

PARAMETER	DC-I1-38	DC-I2-39	DC-I3-40	DC-I5-41	DC-I5-42	DC-I6-43	DC-I8-44	DC-I7-45	DC-I7-46	DC-I7-47	DC-I9-48	DC-I9-49	DC-I10-50	DC-I11-51	DC-I11-52	DC-I12-57	DC-I12-58
ALUMINUM	6700	1300	10000	2200	1400	1200	5700	7900	2400	2500	4000	1100	2400	1200	1200	2200	1900
ANTIMONY	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6	<0.6
ARSENIC	14	<0.5	5.2	1.7	<0.5	7.4	9.4	7.9	6	1.5	14	1.5	4.1	2.1	1.6	4.5	2
BARIUM	860	380	230	140	36	370	270	160	96	87	60	37	84	<7.0	25	54	28
BERYLLIUM	0.29	<0.2	0.56	<0.4	<0.3	<0.1	0.22	0.24	<0.1	0.18	0.21	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2
CADMIUM	6.4	1.2	0.91	0.96	0.2	1.6	1.4	1.4	0.26	0.2	4.5	0.42	0.35	2.2	0.15	0.32	0.2
CHROMIUM	56	9.4	15	40	3.9	250	9.1	15	5.6	6.5	4.2	3.3	7	46	3.7	5.1	3.7
COBALT	8.3	13	12	38	1.4	23	6.2	6.7	4.7	5	17	3.8	11	12	1.4	4.2	3.4
COPPER	480	61	140	250	2.5	130	21	87	2.7	2.7	690	10	3.6	140	2.8	2.3	0.12
IRON	31000	9700	12000	10000	3300	17000	10000	9400	6000	6400	15000	3700	5100	54	2700	4600	3400
LEAD	340	39	70	210	5.4	350	39	27	7.7	4.3	870	31	6.8	220	40	6.3	3.5
MANGANESE	280	86	330	110	34	120	290	180	110	110	130	30	60	140	40	85	39
MERCURY	1.9	0.45	0.06	0.65	(0.01	1.4	0.03	0.06	(0.01	0.02	0.77	0.03	(0.01	0.3	0.05	0.02	0.02
NICKEL	72	260	22	5100	31	98	14	38	12	12	82	8.9	98	620	8.7	7.3	5.7
POTASSIUM	520	270	2000	470	270	310	1600	1700	600	670	480	250	620	620	260	340	240
SELENIUM	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
SODIUM	620	230	220	870	150	1400	86	170	140	130	290	90	180	590	51	68	45
SILVER	0.9	0.7	1.0	1.0	<0.2	0.6	0.8	0.6	0.4	<0.4	<1.0	<0.4	<0.4	<0.2	<0.2	<0.2	<0.2
THALLIUM	5.1	5.1	5.3	4.1	0.98	1.2	1.2	3.5	1.4	1.1	2.1	0.14	1.3	3.5	0.73	1	0.54
VANADIUM	590	17	32	28	5.8	24	17	30	10	10	75	6.1	1.6	<2.0	<2.0	11	6.5
ZINC	3700	480	110	170	12	330	110	260	21	20	690	85	47	1100	15	25	11
CALCIUM	15000	32000	10000	20000	1800	5400	3300	8200	8600	8700	8000	1800	6100	6100	2000	4100	2400
MAGNESIUM	5100	800	5700	1800	880	1100	2100	3900	3400	3500	8100	890	2700	2100	800	1900	1100
BORON	17	6.1	2	12	7	3.2	4.9	6.1	1.8	2	8.7	2.8	4	4.3	1.2	1.6	1
TIN	26	<1.0	<1.0	<1.0	<1.0	11	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
CYANIDE	<0.2	<0.3	<0.2	0.5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	0.6	<0.2	<0.2	<0.2	<0.2	<0.3	<0.4

* Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinois.
Data has not received a QA/QC check independent of laboratory.

TABLE 1-5
VOLATILE ORGANICS
PRELIMINARY GROUNDWATER DATA FOR SITES A,G,& I, UG/L

PARAMETER		DC-GW-23 (EE-13)	DC-GW-24 (EE-12)	DC-GW-25 (EEG-112)	DC-GW-26 (EE-14)	DC-GW-26 (EE-14D)	DC-GW-27 (EE-15)	DC-GW-28 (EE-16)	DC-GW-31 (EE-20)	DC-GW-32 (EE-11)	DC-GW-33 (EEG-106)
VINYL CHLORIDE	(1)	ND	ND	5J	ND	ND	76	790	ND	ND	ND
	(2)	ND	--	--	--	--	86	--	ND	20	--
METHYLENE CHLORIDE	(1)	ND	ND	ND	56J	70J	2J	ND	ND	ND	440
	(2)	6B	--	--	--	--	8B	--	ND	9B	--
ACETONE	(1)	29B	40	17B	100J	740B	10B	190B	29B	1700B	210
	(2)	43B	--	--	--	--	78B	--	8B	660B	--
1,1-DICHLOROETHENE	(1)	ND	ND	ND	ND	ND	10	ND	ND	ND	ND
	(2)	ND	--	--	--	--	18	--	ND	ND	--
1,1-DICHLOROETHANE	(1)	ND	ND	ND	ND	ND	120	ND	ND	ND	ND
	(2)	ND	--	--	--	--	190	--	ND	ND	--
TRANS-1,2-DICHLOROETHENE	(1)	ND	ND	ND	150	170	310	640	ND	ND	110
	(2)	ND	--	--	--	--	380	--	ND	ND	--
CHLOROFORM	(1)	ND	ND	ND	110J	130	ND	ND	ND	ND	ND
	(2)	ND	--	--	--	--	ND	--	ND	32	--
1,2-DICHLOROETHANE	(1)	ND	ND	ND	ND	37J	ND	ND	ND	ND	ND
	(2)	ND	--	--	--	--	ND	--	ND	ND	--
2-BUTANONE (MEK)	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	560
	(2)	ND	--	--	--	--	ND	--	ND	ND	--
1,1,1-TRICHLOROETHANE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	51J
	(2)	ND	--	--	--	--	ND	--	ND	11	--
TRICHLOROETHENE	(1)	ND	ND	ND	270	250	4J	ND	ND	ND	800
	(2)	ND	--	--	--	--	7	--	ND	23	--
BENZENE	(1)	ND	50	20	1400	1500	5	250	ND	460	1800
	(2)	ND	--	--	--	--	10	--	ND	470	--
4-METHYL-2-PENTANONE	(1)	ND	ND	ND	230J	180BJ	ND	ND	ND	ND	150
	(2)	ND	--	--	--	--	ND	--	ND	ND	--
TETRACHLOROETHENE	(1)	ND	ND	ND	470	200	ND	ND	ND	ND	ND
	(2)	ND	--	--	--	--	ND	--	ND	ND	--
1,1,2,2-TETRACHLOROETHANE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
	(2)	ND	--	--	--	--	ND	--	ND	6	--
TOLUENE	(1)	ND	ND	ND	240	220B	ND	740	ND	100BJ	83J
	(2)	ND	--	--	--	--	ND	--	ND	110	--
CHLOROBENZENE	(1)	ND	270	33	3100	2800	120	250	ND	2500	1200
	(2)	ND	--	--	--	--	210	--	ND	270	--
ETHYLBENZENE	(1)	ND	ND	1J	190	130	ND	50	ND	840	ND
	(2)	ND	--	--	--	--	ND	--	ND	720	--
TOTAL XYLENES	(1)	ND	ND	ND	61J	33J	ND	50	ND	400	ND
	(2)	ND	--	--	--	--	ND	--	ND	560	--

NOTES:

1). Preliminary data from IEPA/BAE. Data was stamped "Draft-Subject to Revision". Data was retabulated from best available copy.

2). Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinois. Data has not received QA/QC check independent of laboratory.

ND- Not Detected. Detection limit unknown.

J- Estimated value. Below contract required detection limit.

B- Parameter detected in blank and sample.

-- Split sample not analyzed by Cerro.

TABLE I-6
SEMIVOLATILE ORGANICS & PESTICIDES /PCBS:
PRELIMINARY GROUNDWATER DATA FOR SITES A,C, & I, UG/L

PARAMETER		DC-GW-23 (ER-13)	DC-GW-24 (ER-12)	DC-GW-25 (EEG-112)	DC-GW-26 (ER-14)	DC-GW-27 (ER-15)	DC-GW-28 (ER-16)	DC-GW-31 (ER-20)	DC-GW-32 (ER-11)	DC-GW-33 (EEG-106)
PHENOL	(1)	ND	ND	ND	1000	ND	80	ND	ND	2J
	(2)	ND	--	--	--	ND	--	ND	ND	--
2-CHLOROPHENOL	(1)	ND	5J	ND	370	ND	ND	ND	130	9J
	(2)	ND	--	--	--	ND	--	ND	170	--
1,3-DICHLOROBENZENE	(1)	ND	110	ND	ND	ND	ND	ND	ND	4J
	(2)	ND	--	--	--	ND	--	ND	ND	--
1,4-DICHLOROBENZENE	(1)	ND	640	ND	910	10	110	ND	34J	350
	(2)	ND	--	--	--	18	--	ND	76	--
BENZYL ALCOHOL	(1)	ND	ND	ND	230J	ND	350	ND	ND	ND
	(2)	ND	--	--	--	ND	--	ND	ND	--
1,2-DICHLOROBENZENE	(1)	ND	110	ND	220J	4J	15J	ND	ND	6J
	(2)	ND	--	--	--	ND	--	ND	21	--
2-METHYLPHENOL	(1)	ND	ND	ND	89J	ND	76	ND	ND	ND
	(2)	ND	--	--	--	ND	--	ND	42	--
4-METHYLPHENOL	(1)	ND	ND	ND	350	ND	ND	ND	37J	ND
	(2)	ND	--	--	--	ND	--	ND	68	--
2,4-DIMETHYLPHENOL	(1)	ND	ND	ND	ND	ND	ND	ND	240	ND
	(2)	ND	--	--	--	ND	--	ND	360	--
BIS-(2-CHLOROETHOXY)METHANE	(1)	ND	2J	ND	2900	ND	ND	ND	ND	ND
	(2)	ND	--	--	--	ND	--	ND	ND	--
2,4-DICHLOROPHENOL	(1)	ND	22	ND	1000	ND	ND	ND	ND	11
	(2)	ND	--	--	--	ND	--	ND	ND	--
1,2,4-TRICHLOROBENZENE	(1)	ND	ND	ND	2700	ND	ND	ND	ND	200
	(2)	ND	--	--	--	ND	--	ND	12	--
NAPHTHALENE	(1)	ND	ND	ND	57J	ND	230	ND	36J	ND
	(2)	ND	--	--	--	ND	--	ND	78	--
4-CHLOROANILINE	(1)	ND	140	14	8300	18	9600E	ND	15000E	110
	(2)	ND	--	--	--	11	--	ND	8400	--

TABLE I-6
SEMIVOLATILE ORGANICS & PESTICIDES /PCBS*
PRELIMINARY GROUNDWATER DATA FOR SITES A,C, & I, UG/L

PARAMETER		DC-GW-23 (EE-13)	DC-GW-24 (EE-12)	DC-GW-25 (EEG-112)	DC-GW-26 (EE-14)	DC-GW-27 (EE-15)	DC-GW-28 (EE-16)	DC-GW-31 (EE-20)	DC-GW-32 (EE-11)	DC-GW-33 (EEG-106)
4-CHLORO-3-METHYLPHENOL	(1)	ND	ND	ND	140J	ND	ND	ND	ND	ND
	(2)	ND	--	--	--	ND	--	ND	ND	--
2-METHYLNAPHTHALENE	(1)	ND	1J	ND	ND	ND	9J	ND	ND	ND
	(2)	ND	--	--	--	ND	--	ND	ND	--
2,4,6-TRICHLOROPHENOL	(1)	ND	ND	ND	290	ND	ND	ND	ND	3J
	(2)	ND	--	--	--	ND	--	ND	ND	--
DIMETHYL PHTHALATE	(1)	ND	ND	ND	ND	ND	ND	ND	9B	ND
	(2)	ND	--	--	--	ND	--	ND	10U	--
DIETHYL PHTHALATE	(1)	ND	ND	23B	ND	12B	140B	8BJ	ND	ND
	(2)	ND	--	--	--	ND	--	10U	ND	--
FLUORENE	(1)	ND	ND	ND	ND	ND	25J	ND	ND	ND
	(2)	ND	--	--	--	ND	--	ND	ND	--
PENTACHLOROPHENOL	(1)	ND	ND	6J	2400	7J	60J	ND	ND	ND
	(2)	ND	--	--	--	ND	--	ND	ND	--
ANTHRACENE	(1)	ND	ND	ND	ND	2JB	ND	ND	ND	ND
	(2)	ND	--	--	--	ND	--	ND	ND	--
DI-n-BUTYL PHTHALATE	(1)	2JB	7BJ	2JB	ND	ND	ND	4BJ	ND	12B
	(2)	ND	--	--	--	ND	--	10U	ND	--
bis(2-ETHYLHEXYL) PHTHALATE	(1)	2JB	5BJ	3JB	ND	2	20BJ	3BJ	ND	4BJ
	(2)	ND	--	--	--	ND	--	10U	ND	--
DI-n-OCTYL PHTHALATE	(1)	ND	ND	ND	ND	ND	ND	ND	ND	2BJ
	(2)	ND	--	--	--	ND	--	ND	ND	--

NOTES:

1). Preliminary data from IEPA/E&E. Data was stamped "Draft-Subject to Revision". Data was retabulated from best available copy.

2). Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinois. Data has not received QA/QC check independent of laboratory.

ND- Not Detected.

J- Estimated value. Below contract required detection limit.

B- Estimated value.

B- Parameter detected in blank and sample.

*- Priority Pollutant Pesticides/PCBs were not detected in any samples.

-- Split sample not analyzed by Cerro.

TABLE I-7
METALS & WATER CHEMISTRY*
PRELIMINARY GROUNDWATER DATA FOR SITES A,C,& I, MG/L

PARAMETER	IGWUS**	DC-GW-23 (RE-13)	DC-GW-27 (RE-15)	DC-GW-31 (RE-20)	DC-GW-32 (RE-111
ALUMINUM	--	0.13	0.09	<0.01	0.06
ANTIMONY	--	<0.01	<0.01	<0.01	0.028
ARSENIC	1.0	0.008	0.01	<0.005	0.009
BARIUM	5.0	0.19	0.19	0.14	0.14
BERYLLIUM	--	<0.005	<0.005	<0.005	<0.005
CADMIUM	0.05	0.005	0.005	0.002	0.006
CHROMIUM	0.05	<0.01	<0.01	<0.01	<0.01
COBALT	--	0.02	0.01	<0.01	0.02
COPPER	0.02	0.02	0.02	0.01	0.01
IRON	1.0	20	9.9	0.1	32
LEAD	0.1	0.05	0.05	0.03	0.05
MANGANESE	1.0	1.3	1.2	0.12	2.0
MERCURY	0.0005	<0.0002	<0.0002	<0.0002	<0.0002
NICKEL	1.0	0.03	0.02	0.03	0.06
TIN	--	<0.02	<0.02	<0.02	<0.02
SELENIUM	1.0	<0.005	<0.005	<0.005	0.022
THALLIUM	--	0.03	0.03	<0.01	0.04
VANADIUM	--	<0.03	<0.03	<0.03	0.04
ZINC	1.0	0.02	0.04	0.03	0.06
CYANIDE	0.025	<0.01	<0.01	<0.01	<0.01
SPEC.COND.(umhos)	--	1700	2000	800	6600
TTL. DISS. SOLIDS	--	1300	1300	500	5200
ALKALINITY	--	480	390	370	2300
BORON	1.0	0.6	0.5	0.56	1.3

NOTES:

* Split samples received by Cerro Copper. Analyzed by Daily Analytical Laboratories, Peoria, Illinois. Data has not received QA/QC check independent of laboratory.

** Illinois General Water Use Standard

-- General Water Use Standard not set for this parameter.

the site in the late 1940's and by 1955 was filled with unknown materials. E&E has determined that excavation also occurred in the early 1970s and a building was erected at the site sometime prior to 1973. The operations at the site during this time period are unknown. This second excavation was filled with unknown materials by 1979.

The area is currently being investigated by IEPA because the area has been filled with "foreign" material. No data is available to indicate the disposal of hazardous material. Draft results of samples taken by E&E indicate detectable levels of PAHs and PCBs in the subsurface. The actual sampling locations and inorganic data on the samples is currently unknown.

SITE L

Site L is the location of a former surface impoundment used by the Harold Waggoner Company to dispose of wash water generated from a truck cleaning operation. The Waggoner Company specialized in hauling industrial wastes for companies in the St. Louis/Metro East area. The impoundment was located approximately 250 feet south of the present Metro Construction Company building and approximately 125 feet east of Dead Creek. The impoundment is now covered with cinders and is used by Metro Construction for equipment storage.

Harold Waggoner operated the company from 1964 to 1974 and reportedly discharged wash water into Dead Creek until 1971. A pit was excavated to store the water in August of 1971 after the IEPA ordered Waggoner to stop discharging. In 1974, the operation was sold to Ruan Trucking Company which reportedly continued the wash water storage until 1978. The property is currently owned by Metro Construction Company.

Monitoring well G109, located approximately 100 feet west of the former impoundment, was installed by the IEPA in 1980. Initial sampling in 1980 indicated the presence of chlorophenol, phenolics, cyclohexanone and heavy metals. It is reported that during the installation of this well, the drillers became nauseous from fumes at the well location. The analysis of subsequent samples obtained in 1981 indicated the presence of phenolics and heavy metals. Prior to the E&E study, only one soil sample was obtained adjacent to the impoundment

area, except those from Dead Creek. Only PCBs which were present at 80 ppm, were detected at levels above those felt to be background.

Geophysical studies were performed by E&E in December of 1985. Several abnormalities were detected but an accurate assessment could not be made due to surface interference. Although the actual sampling locations are currently unknown, draft results of subsurface samples indicate detectable levels of volatiles (such as benzene, toluene, and xylene), chlorinated benzenes, and PAHs. Pentachlorophenol was also detected at levels over 10 ppm. PCBs were not detected.

SITE M

Site M is a sand pit excavated by the H. H. Hall Construction Company in the mid to late 1940's. The pit is located immediatly east of Dead Creek and approximately 300 feet north of Judith Lane.

The only information available concerning waste disposal at Site M, have been the various complaints IEPA and the Cahokia Health Department have received about the pit and the adjacent creek in past years. In 1980, the IEPA sampled several private wells in the area and water seepage in a nearby basement. The results indicate copper, manganese, and phosphorus in one or more of the wells and in the seepage. Water and sediment samples obtained from the pit also contained heavy metals and PCBs. However, a hydrologic connection between the pit and the groundwater is inconclusive since the water level in the pit is approximately 2.0 feet higher than those found in nearby monitoring wells.

Draft results of sediment samples, taken by E&E from the pit, indicate detectable levels of PCBs (20 ppm). The only other organic parameters detected were phthalates which may not be indicative of contamination. Surface water analysis did not detect contamination. Inorganic results are not available for the sediment or water samples.

SITE N

Site N is the location of a former sand pit. The site is bordered on the north by residential property along Judith Lane; on the west by Dead Creek; on the south by residential property along Edwards Street; and on the east by Falling Springs Road.

Excavation is believed to have begun in the late 1940's as a borrow pit. The pit is currently filled in and is being used as part of an operations and equipment storage facility for the H. H. Hall Construction Company.

No known disposal of hazardous material has occurred at the site and no previous sampling data exists. E&E is to collect several surface and subsurface soil samples, soil gas and ambient air samples during their study. Results of most of this investigation have not been made available. Draft results of subsurface samples did not indicate any subsurface organic contamination.

SITE O

Site O, located on Mobile Avenue, is the Sauget Wastewater Treatment Plant and related property. The site consists of four inactive sludge dewatering lagoons, a waste pit and a separate area of contamination at the northwest corner of the property. The plant treats effluent from area industries including Monsanto, Cerro Copper, Sterling Steel Foundry, Amax Zinc, Rogers Cartage, Edwin Cooper and Midwest Rubber. It is believed various other industries, including Mobil, previously discharged waste to the plant. The facility also received domestic waste from Sauget residents prior to the completion of the new American Bottoms Regional Treatment Plant.

The lagoons were used for disposal of clarifier sludge from 1965 to approximately 1978. They are presently filled in and have been vegetated.

In May 1984, black tar-like material was uncovered south of the lagoons during a trench excavation. Samples of the material were collected and analyzed by Envirodyne Engineers, Inc. of St. Louis. The material, believed to be sludge from the lagoons, contained PCBs, phenol and a high percentage of oil and grease. Other priority pollutants were not analyzed.

In 1983, another contaminated area was identified by IEPA directly west of the treatment plant. Surface and subsurface soil samples were collected during two stages and were analyzed for PCBs and/or TCDD. The results indicate significant PCB (149,600 ppb) and

TCDD (170 ppb) contamination throughout the area. The contaminated soil has since been excavated and is stored on-site. The piles are within a fenced area and have been covered with gravel. The final disposition is unknown.

Geraghty & Miller, Inc. on behalf of the Sauget Sanitary Development and Research Association (SSDRA) conducted a groundwater study of the property. Although the report concludes that contamination is present, it stated offsite impacts are minimal and remediation is not warranted and/or feasible. A clay cap and a partially penetrating slurry wall was recommended to prevent lateral migration of the waste from the lagoons and the pit. Comments from USEPA and IEPA were very critical of the report, concluding that the assessment needs to be expanded. Additional monitoring was recommended to identify the extent and sources of contamination. Containment of the waste was also not in common agreement as an appropriate remedy, since the site conditions are not fully identified and containment methods have been known to fail over time.

The actual sampling locations are not currently known; however, draft results of subsurface samples obtained by E&E at Site O indicate various organic contamination. Volatiles (such as benzene, ethylbenzene, toluene and xylene), PAHs, chlorobenzenes and PCBs were detected. Inorganic data is currently not available.

SITE P

Site P is an inactive, IEPA-permitted landfill. The site is bordered on the west by the Illinois Central Gulf Railroad; on the south by Monsanto Avenue and on the east by the Terminal Railroad Association Railroad. The two railroads converge to delineate the north boundary.

The site was operated by Sauget and Company during the early 1970's through the early 1980's. Facility operating records reviewed during E&E's study found several entries of chemical disposal by Monsanto Company. Material identified included phosphorus pentasulfide and ACL filter residues. Some of the material is recorded as being removed, however, the composition of all the material landfilled is unknown. Diatomaceous earth filter cake from Edwin Cooper, Inc. (now

Ethyl Corp.) was also landfilled in compliance with a supplemental IEPA permit. Analytical data indicates that this material contains lead, cadmium and zinc.

E&E was to conduct a groundwater and subsurface soil characterization study of the landfill. Draft results of subsurface soil samples indicate detectable levels of volatiles and chlorinated benzenes. A complete set of results of their work was not available at this time.

SITE Q

Site Q is the Sauget/Sauget Landfill, an inactive waste disposal facility operated by Sauget and Company between 1966 and 1973. The site is located on the east bank of the Mississippi River, on the river side of the flood control levee.

Documents relating to the site operation indicate chemical wastes were disposed in the landfill. In 1980, drums of unknown wastes were uncovered during excavation of a railroad spur.

USEPA had its Field Investigation Team (FIT) contractor conduct a study in 1983. A geophysical investigation determined the probable extent of landfilling and indicated areas of possible drum burial. Soil samples were taken during a drilling program and analysis detected among others 2,4-dichlorophenol, 1,2,4-trichlorobenzene, 1,4-dichlorobenzene, toluene, and PCBs. Two samples also had detectable levels of 2,3,7,8-TCDD (dioxin).

Complete results from the additional work conducted by E&E are unknown. Draft results of groundwater samples indicate contamination from organics. Volatiles, phenol (190,000 ppb), pentachlorophenol (35,000 ppb) and naphthalene (15,000 ppb) were all detected. Inorganic results are not available.

Site R

Site R is known as the Sauget Toxic Dump and/or the Krummrich Landfill. The area is an inactive industrial waste landfill used by Monsanto adjacent to the Mississippi River and is presently covered with a clay cap and is vegetated.

Both the Monsanto, W. G. Krummrich Plant in Sauget and the J. F. Queeny Plant in St. Louis filed Notification of Hazardous Waste Site Forms for the landfill. Community interviews conducted by the IEPA also indicated other area industries, including Cerro Copper, dumped material at the landfill. Currently there is no evidence to substantiate this or to indicate the type or volume of material. Cerro has no records of material being disposed in this landfill.

Reportedly, the site contained liquid waste pits as well as disposed drums. Previous sampling has indicated elevated levels of chlorinated organics, including PCBs, and various inorganics in the subsurface water and soils.

Geraghty & Miller, Inc. on behalf of Monsanto conducted a groundwater study of Monsanto property. The study included the Krummrich Plant and the landfill. The report concludes that contamination is present, however, off-site impacts are minimal and remediation is not warranted and/or feasible. Comments from USEPA and IEPA were very critical of the report, concluding that the assessment needs to be expanded. Downgradient and deep aquifer conditions are not adequately described and sources are not sufficiently identified.

Complete results from additional work conducted by E&E on Monsanto property is unknown. Draft results of groundwater samples indicate contamination from organics. Volatiles, phenols (60,000 ppb), and chlorophenols (over 20,000 ppb) were all detected. Inorganic results are not available.

MISCELLANEOUS AREAS

Although they are not being investigated under the RI/FS, other areas of contamination are present in close proximity to Cerro Copper and may be effecting results of monitoring efforts.

Monsanto Company has conducted a fairly extensive study of subsurface conditions at the Krummrich Plant. The study, conducted by Geraghty & Miller, indicated that groundwater contamination is present at the plant in the shallow and intermediate zone of the aquifer and is moving to the south and the west. The figures in the report arbitrarily indicate that contamination ends at the Monsanto-Cerro Copper property

line. This would appear unrealistic since monitoring has not been conducted off of Monsanto property.

USEPA and IEPA comments on the Monsanto report were critical of the conclusions and recommendations developed. The major comment was that the groundwater assessment needed expanding. Downgradient and deep aquifer conditions are not adequately described and both onsite and off-site sources of contamination were not sufficiently identified. The status of additional work or actions by Monsanto or IEPA are currently unknown. A full assessment of the contamination coming from Monsanto's property needs to be completed to effectively evaluate the data generated during the IEPA RI/FS.

Another source of contamination in the Sauget area is a Monsanto "drum disposal site" west of Route 3 and north of the former Darling Company property (now owned by Cerro Copper). Approximately 5,000 drums of nitrochlorobenzene were discovered at the site in 1985. In January of 1986 a removal operation was halted in the early stages when excavation revealed that many of the drums were corroded and the contents had leaked into the surrounding soils and groundwater.

Geraghty & Miller conducted a study of the drum site for Monsanto and proposed a clay cap as a remedial measure. USEPA and IEPA were again very critical of the report and recommended an expanded assessment in the form of a unique RI/FS for the site. The concept of the clay cap was rejected based on the information available that the groundwater level moves up into the drum site and contamination has already moved away from the site. The clay cap will not stop the migration of the contaminants. Despite the agencies' dissatisfaction with the action, it is believed, based on IEPA correspondence, that the site has been capped. Additional work performed by Monsanto or its consultant on the assessment is unknown.

IV REFERENCES

1. Baker, W. H. Jr.; Groundwater Levels and Pumpage in the East St. Louis Area, Illinois, 1967-1971; Illinois State Water Survey, Urbana; 1972.

2. Bergstrom, R. E. and Walker, T. R.; Groundwater Geology of the East St. Louis Area, Illinois; Illinois State Geological Survey; 1956.

3. Bruin, J. and Smith, H. F.; Preliminary Investigation of Groundwater Resources in the American Bottom in Madison and St. Clair Counties, Illinois; Illinois State Water Survey Division; 1953.

4. Ecology and Environment, Inc.; Description of Current Situtation at the Dead Creek Project Sites; 1986.

5. Emmons, J. T.; Groundwater Levels and Pumpage in the East St. Louis Area, Illinois, 1972-1977; Illinois State Water Survey, Urbana; 1979.

6. Illinois Environmental Protection Agency Project Files; October 1987.

7. Illinois State Water Survey, Urbana, Regional Files; October 1987.

8. Schicht, R. J. and Jones, E. G.; Ground-Water Levels and Pumpage in East St. Louis Area, Illinois, 1890-1961; Illinois State Water Survey, Urbana; 1962.

9. Schicht, R. J.; "Electric Analog Model Study of a Sand and Gravel Aquifer;" Transactions of the ASAE, Vol. 7, No. 3; 1964.

10. Schicht, R. J.; Ground-Water Development in East St. Louis Area, Illinois; Illinois State Water Survey, Urbana; 1965.

11. St. John, R.; A Preliminary Hydrogeologic Investigation in the Northern Portion of Dead Creek and Vicinity; Illinois Environmental Protection Agency; 1981.

APPENDIX II

AERIAL PHOTOGRAPHS

USDA - ASCS

North

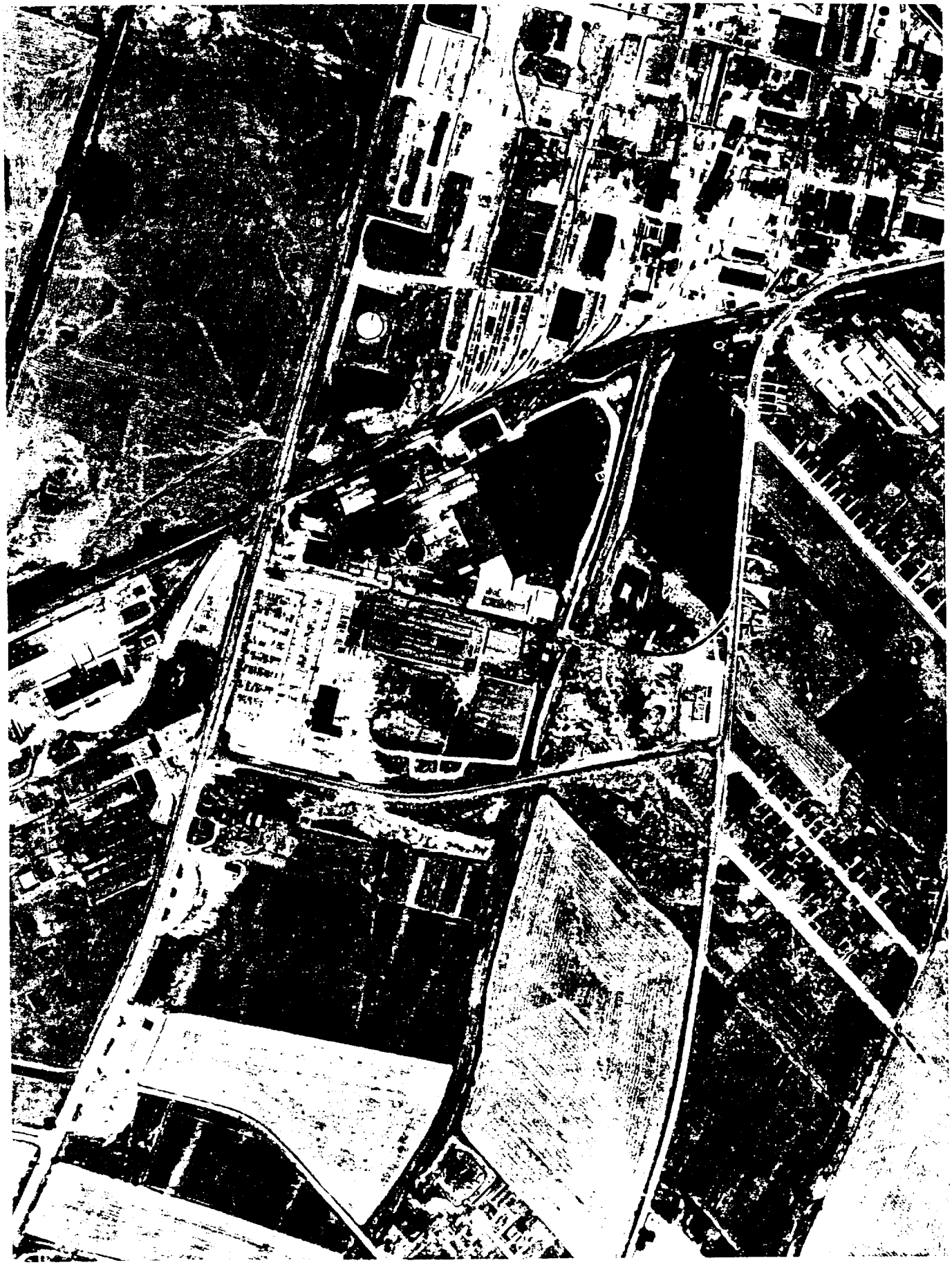
1'=1000

September 19, 1937

North

1'=1000

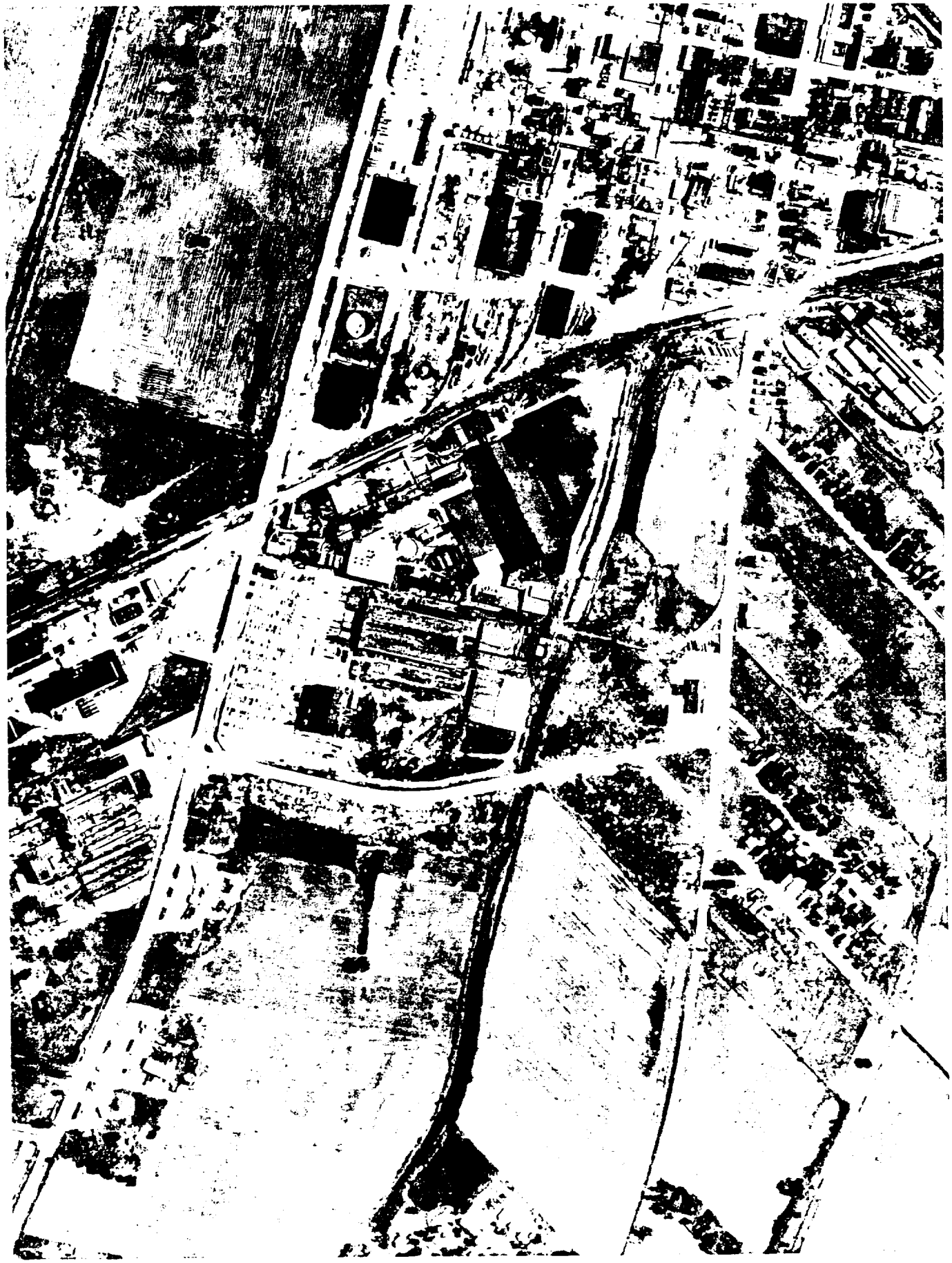
June 27, 1950



North

1'=1000

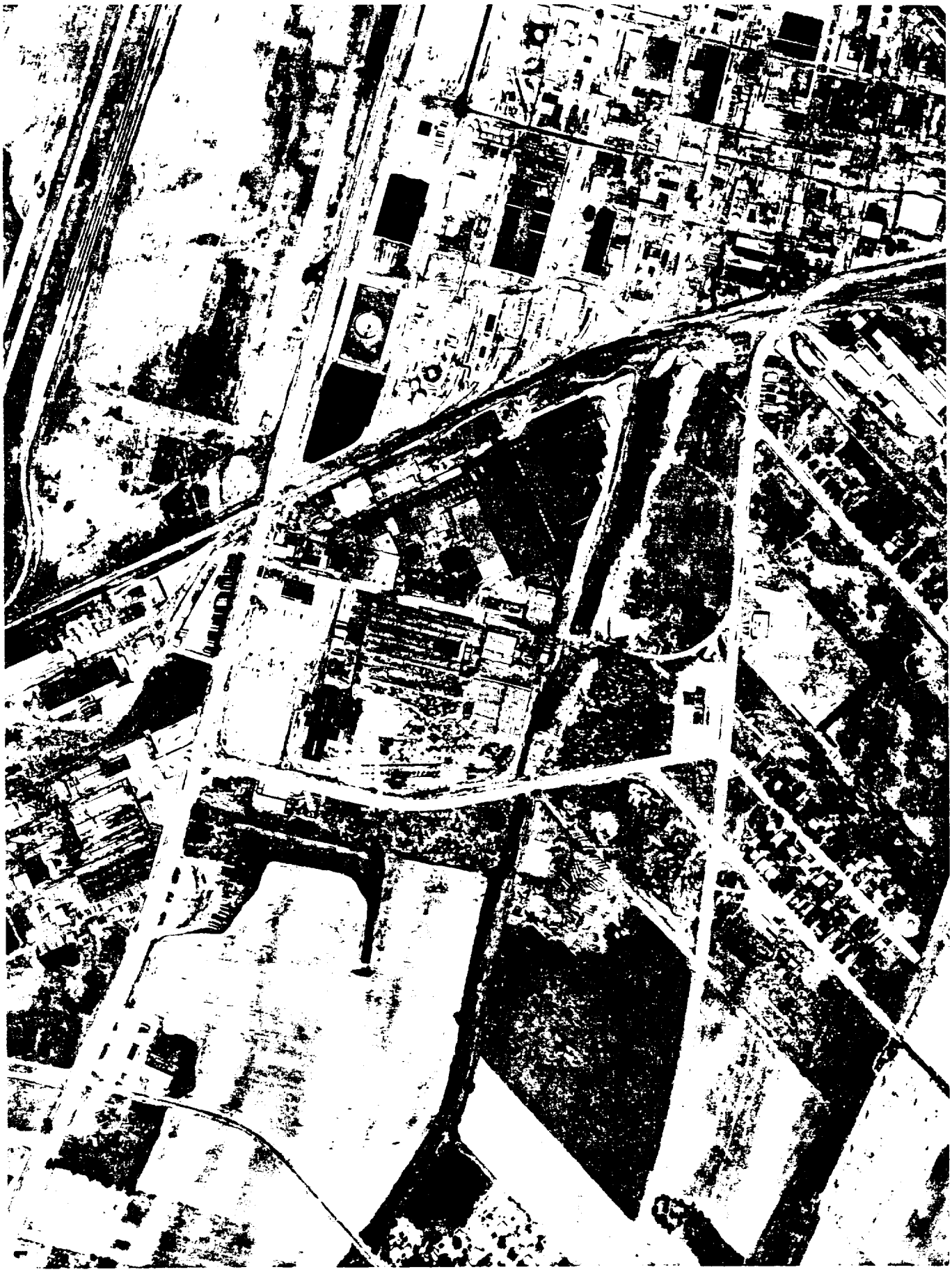
July 12, 1955



North

1'=1000

July 9, 1962



North

1'=1000

September 2, 1968